

NOTES ON SOME HUMAN REMAINS IN THE LOWER MURRAY VALLEY, SOUTH AUSTRALIA.

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Figs. 1-249.

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I. INTRODUCTION.

This paper records preliminary observations regarding two adjacent sites, in the Lower Murray Valley, where human remains were associated with occupational debris; the chief interest in both cases is the possible bearing of the evidence on the antiquity of man in South Australia.

In Australia little research by systematic methods has been carried out on aboriginal camping-sites; in the present instance the work was undertaken along lines developed and approved in countries where similar investigations are carried on.

The localities concerned are in the vicinity of Old Devon Downs, seven

kilometres below Nildottie township; here there is, within a small area, the connected evidence recorded herein.

Our interest in this part of the Murray Valley was stimulated by the discovery by Mr. W. R. Roy, of New Devon Downs Station, of a human skeleton embedded in sand-rock. Portion of the calvarium had weathered out, with part of its matrix, and was given to the late Museum Director in January, 1928; the last-named died shortly after, and no record of the donor or locality was then available. The specimen was exhibited before the Royal Society of South Australia (Tindale, 1928, p. 248).

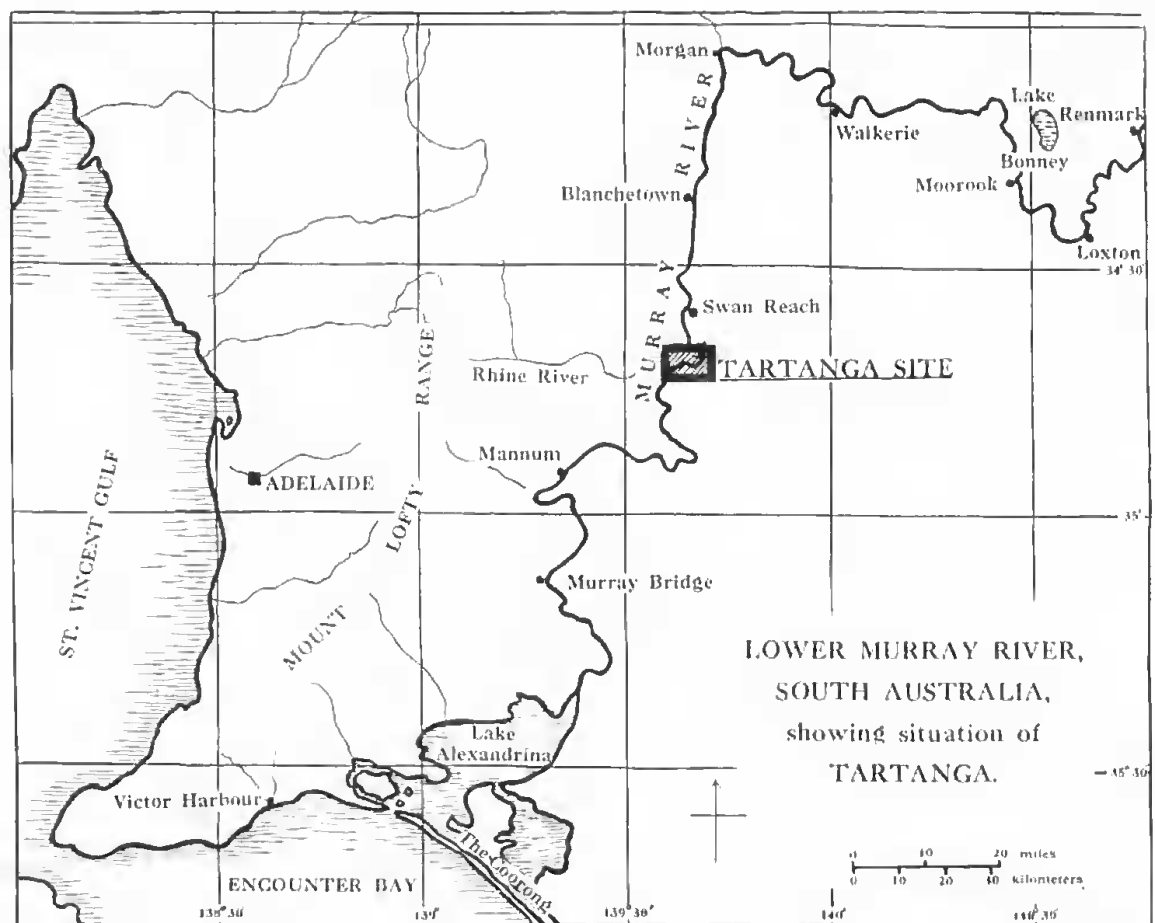


Fig. 1. Lower Murray River, South Australia. (For enlargement of Tartanga site see fig. 2.)

In April, 1929, Mr. Roy made enquiries regarding his donation, and the site was at once visited by the writers; a preliminary survey of two days indicated that the find might prove to be of consequence, and plans were outlined for more intensive work.

The bones were embedded in one of the lowest of a series of nine stratified

deposits, situated on a long, narrow island between the river and a lagoon at "Tartanga," in the Hundred of Ridley (figs. 1-2). The word "Tartanga" was the aboriginal name for part of the site, including the lagoon, and it has therefore been adopted. Several hundred examples of animal food remains, other camp debris and the human skeleton mentioned above were taken from the deposits.

Three weeks later a more extended survey was commenced. With the aid of assistants excavations were carried out, and detailed maps and sections of the locality were prepared; much other material, including portions of two further human skeletons, about two thousand examples of vertebrate and molluscan remains, and stone and bone artefacts, were then obtained from the Tartangan deposits.

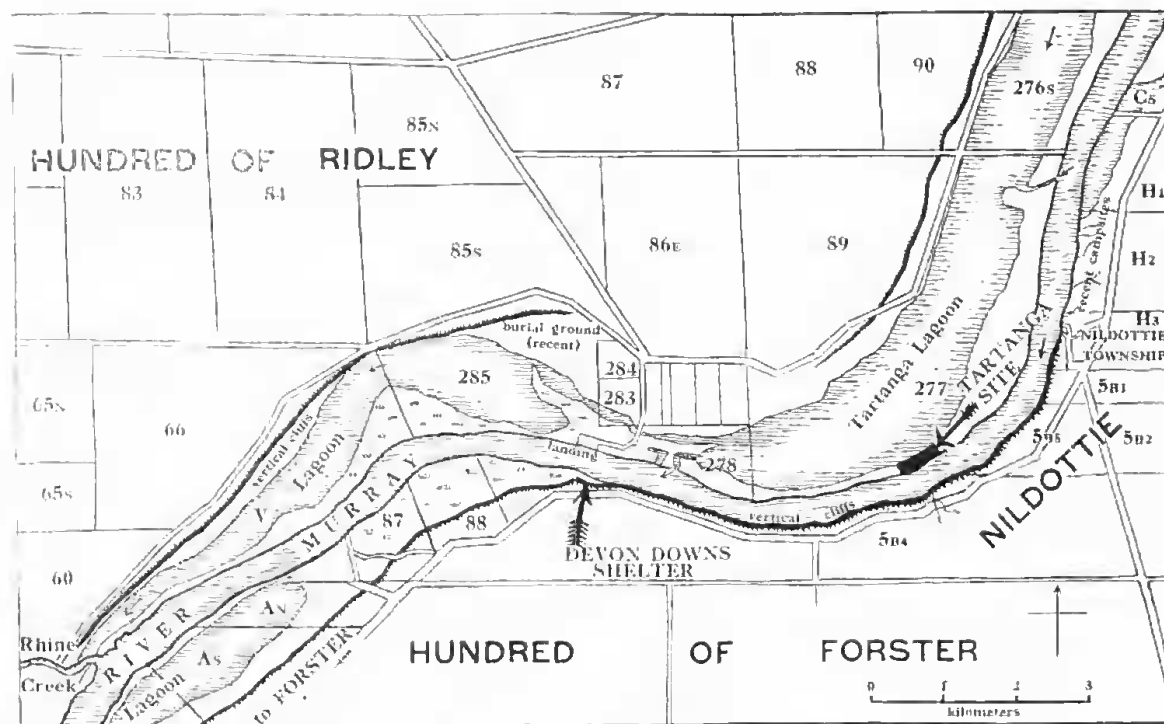


Fig. 2. Tartanga, Devon Downs and the vicinity. River Murray, South Australia.

Opposite Old Devon Downs, one and one-half kilometres west of Tartanga, there is a cliff-shelter, first described by Sheard (1927). It was considered desirable, at this stage, to also investigate the stratification of the debris in the shelter; the excavation of a narrow trench showed that occupational material extended to a depth of at least 5 metres. The bottom of the debris had not been reached at this depth, and the results were sufficiently striking to warrant additional research. Consequently, during November and December of 1929

the excavation was continued, on a much larger scale, to the bottom of the deposits.

The results of the excavations at Tartanga and Devon Downs are detailed below. It is perhaps advisable to state here that, in carrying out the whole of the work, no unskilled labour was requisitioned; all excavations were made by the authors personally, assisted by three trained scientific assistants who are also permanent officers of the South Australian Museum staff.

II. TARTANGA.

LOCALITY AND PHYSIOGRAPHY.

The site of Tartanga is on the south-eastern boundary of Section 277, Hundred of Ridley (fig. 2), and is situated on portion of a long and narrow spit between the river and a lagoon through which water is almost constantly flowing, although the direction of the flow may be temporarily reversed when a southerly breeze "banks" the water in the main stream. The part of the spit concerned is an island, as the river bifurcates at its eastern end, the main body of water following the river, the remainder flowing into the lagoon through a narrow channel and joining the river again by another channel through the spit, three kilometres to the west, on Section 278. When the river is heavily flooded, as for example in 1917, the island is almost wholly inundated. It commands a view of the whole valley in all directions for a considerable distance, and there is abundant animal life in the adjacent lagoon.

A diagrammatic section of the Murray Valley at Tartanga is given in fig. 3; the valley is here about one and one-half kilometres in width. The river is approximately 100 metres wide, and it is cutting into its left (or south-eastern) bank of Middle Caeozoic marine limestone cliff, which is vertical and about 30 metres in height. The south-eastern side of the spit constitutes the north-western bank of the main stream.

At the site under discussion the spit varies in width from 60 to 100 metres, and the flowing lagoon is eroding its low graded north-western aspect. On this side a series of strata of consolidated sand has been exposed and weathered; these deposits, most of which are as hard as baked brick, were traced for two kilometres westward. The exposures of their weathered surfaces vary in extent, but are nowhere more than a few metres in width. A contour map of the Tartangan portion of the spit was made, the form-lines utilized being those conveniently provided by flood-levels (fig. 5).

From early observations it was concluded that the consolidated deposits extended below the recent muds and silts of the "Upper Beds" which now form

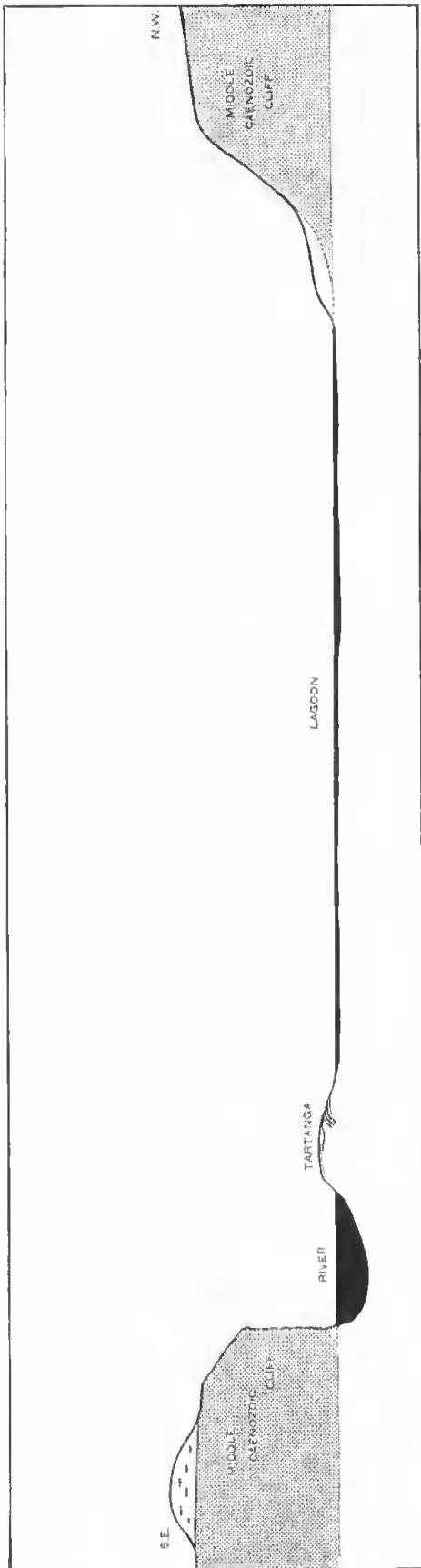


Fig. 3. Diagrammatic cross-section of the Murray Valley at Tartanga, South Australia.

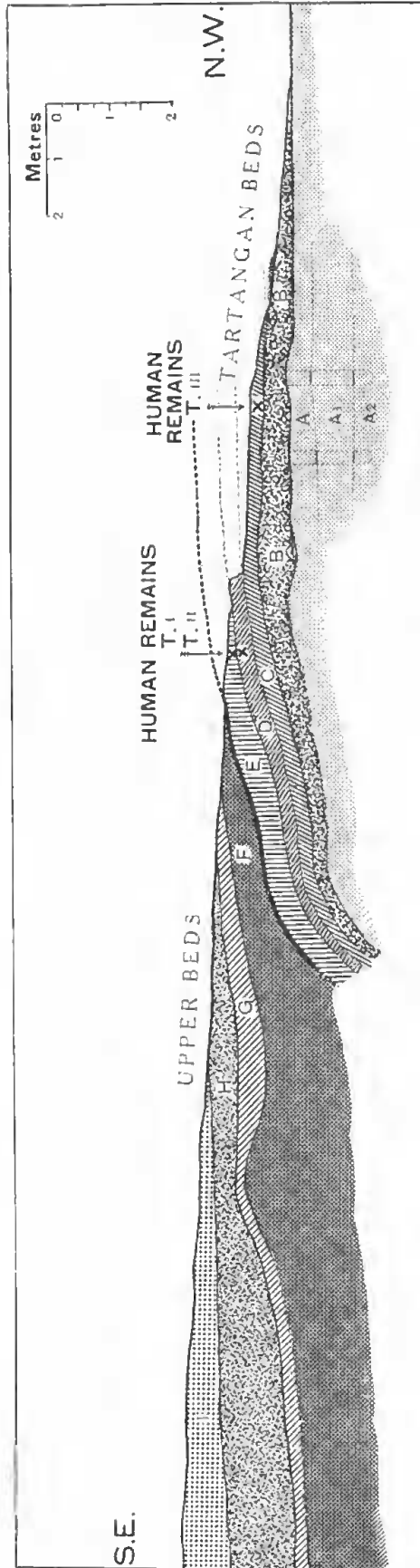


Fig. 4. Section of the Tartangan and Upper Beds at Tartanga, upon which the relative positions of the human remains have been projected. (See also fig. 5.)

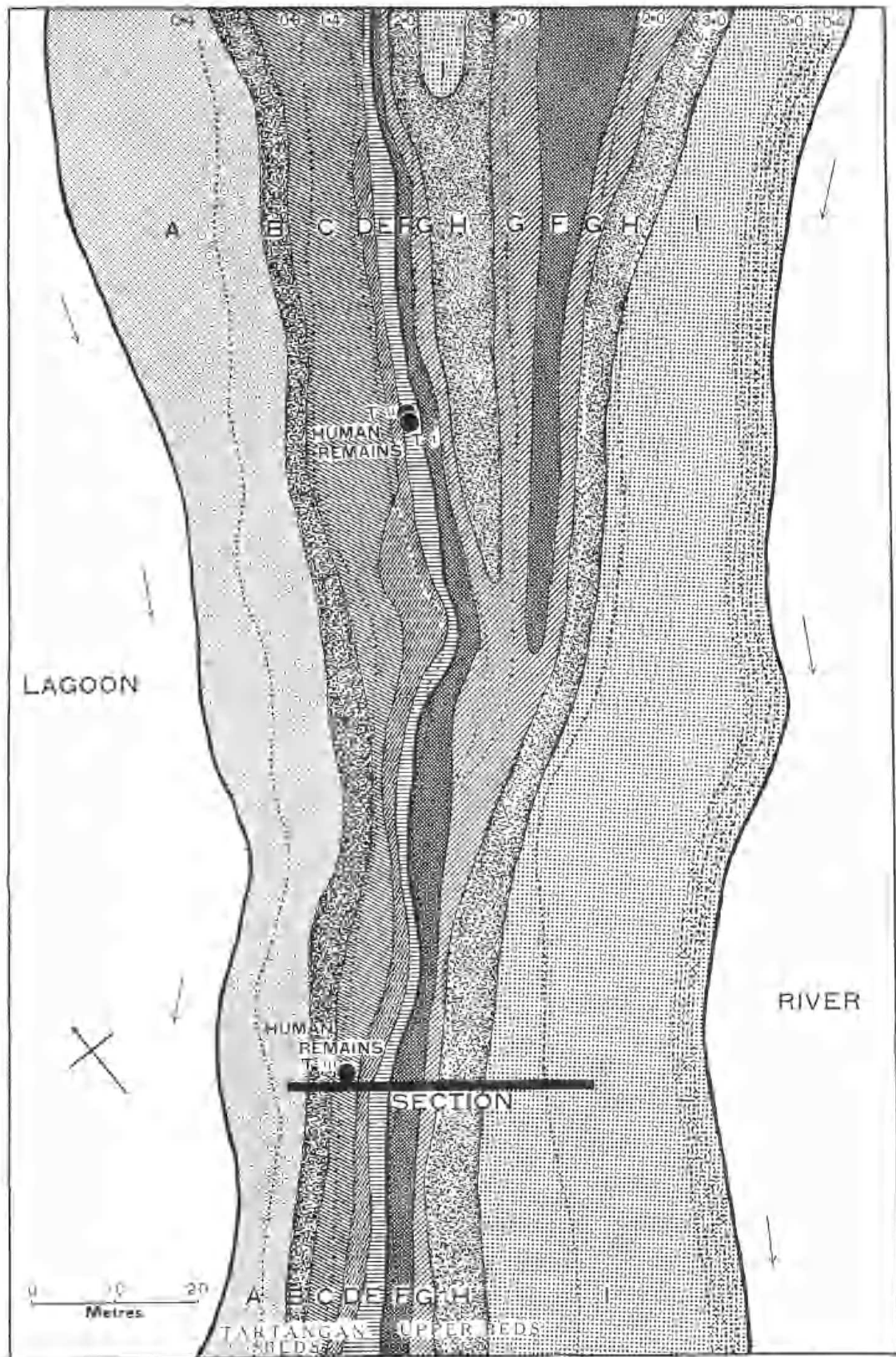


Fig. 7. Contour plan of portion of Tartangan site, showing locations of the human skeletons recovered.

the great bulk of the island. On the second visit to the locality a trench was made across portion of the spit, in order that exact data might be secured, and the facts detailed below were established.

STRATIFICATION.

The accompanying section of the beds at Tartanga (fig. 4) was drawn to scale from measurements secured after excavation. For convenience of reference, and for labelling specimens in the field, the respective layers were tentatively called A, B, C, etc., and now, as a large number of specimens and much data thus referred to has accumulated, these designations have been retained in order to prevent confusion.

Stratum A in the sketch forms the lagoon shore, and is the lowest deposit to which we excavated, although borings suggest the presence of occupational debris, including fresh-water mussels (*Unio*) in at least two other beds below it; these two layers underlying A consist of one (A¹) of sandy blue clay, 75 cm. in thickness, and another (A²) of red sand of unknown thickness. Stratum A is composed of soft grey to white sand, of a maximum depth of 45 cm. The three overlying strata (B, C, and D) are composed of consolidated sand and numerous limy nodules, and in parts are so indurated that in weathering they have formed abrupt terraces, or have dropped, as weathered pavements, owing to erosion of softer underlying material; their maximum depths are, B, 50 cm.; C, 30 cm.; D, 40 cm. Overlying layer D is a rather less consolidated stratum (E, about 40 cm. in thickness), composed of sand and very numerous limy nodules. These four more or less consolidated layers (B, C, D, and E) are of distinctive colourations (and impart characteristic stains to the contained fossils) a fact which was of considerable assistance in tracing the beds. Thus, B is yellow, with heavy ferruginous staining; C is bluish-grey; D exhibits ferruginous staining on the lower half of the stratum, and is yellowish-white above; E is greyish-white. Each of the weathered terraces is strewn with water-sorted limy and ferruginous nodules, characteristic of the beds from which they were derived.

The four successive and more recent deposits overlying the strata mentioned above are also well differentiated. They consist of: F, blue-black clay; G, grey clay; H, mud and sand; I, fine sand. Professor J. A. Prescott (of the Waite Agricultural Research Institution) examined samples of these "Upper Beds," and reports that they are markedly alkaline, and have pH values as follows: F, 8.0; G, 8.5; H, 8.5; I, 8.0.

The consolidated strata B to E represent successive surfaces of an old island, now mostly eroded away on its western side by the lagoon. Dr. Charles

Fenner is of the opinion that the eastern slopes of these beds represent the former successive western banks of the river, and that the latter has swung 40-50 metres to the south-east as it has cut for a similar distance into the steep and fairly resistant limestone cliff; it is obvious that the greater part of this work took place after the period when the camp-debris in these strata was laid



Fig. 6. Young cliff directly opposite Tartanga site; the cross marks the position from which fig. 7 was taken.

down. The newer "Upper Beds" (F to I) have been deposited (and have covered the eastern slopes of the older beds) as the river has cut into its concave eastern bank.

In fig. 6 portion of the young cliff opposite the section cut at Tartanga is illustrated; the spot from which the panoramic photographs reproduced in fig. 7 were taken is marked X.

In a period antecedent to the present stage of active cliff erosion opposite Tartanga, the aforementioned rock-shelter at Old Devon Downs (Section 89, Hundred of Nildottie) appeared near the western end of this concave cliff, at about its junction with the convex section which curves to the south-west (fig. 2). In this shelter a succession of human occupational debris, more recent than that of Tartangan beds A to E, was deposited over a period sufficiently long for some notable changes, described in Part III of this paper, to have taken place.

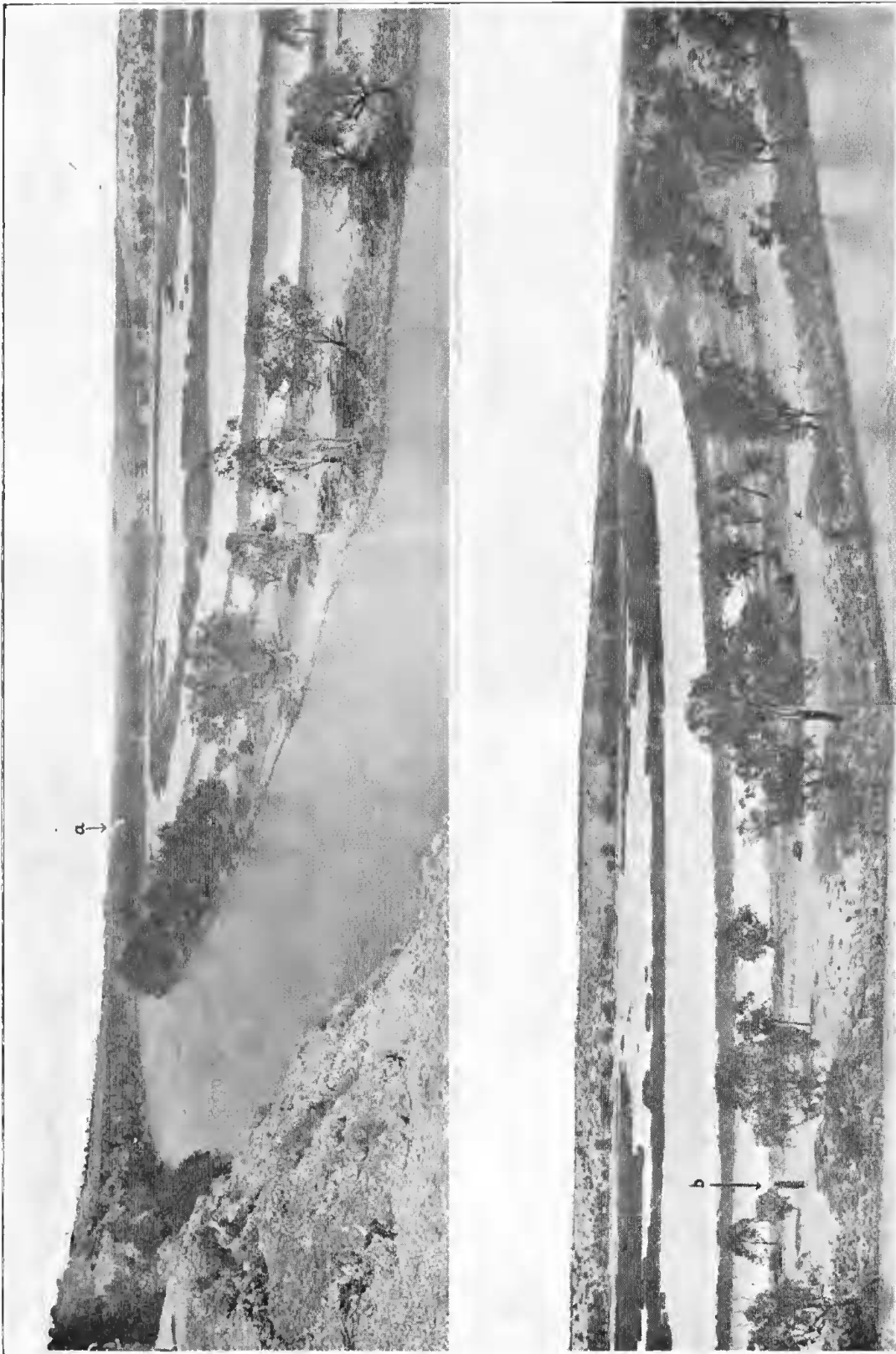


Fig. 7. Panoramic views of the Murray Valley. Upper figure looking south and west; lower figure looking west and north. a, indicates position of Devon Downs Shelter; b, site of trench and section at Tartanga.

TARTANGAN BEDS (A TO E).

For convenience of reference the term "Tartangan" is herein restricted to the period during which beds A to E were occupied and deposited. The excavations show that, with the probable exception of beds F and G, all of the above-mentioned deposits, A to I, contain evidence of aboriginal occupation, but there is a marked difference in the animal remains from series B to E as compared with those from above the very thick and almost sterile stratum F. For instance, in the earlier deposits bones are heavily stained with iron oxide (particularly those from B and the lower part of D), and have undergone considerable mineralization, while mussels have lost all trace of epidermis. In the Upper Beds, on the other hand, the majority of the mussels show at least some trace of epidermis, and bones are little changed. The fossils from strata B to E are in most cases embedded solidly in the matrix, and commonly form the nuclei of large limy nodules. This was discovered in breaking open some of the latter while excavating and, later, bones were secured in weathered nodules.

Many bones of fish and fresh-water tortoises, *Unio* shells, burnt stones, etc., lie on the various miniature beaches amongst the limy nodules and other detritus weathered from beds B to E. A large amount of such material was secured by searching and by extensive sieving. In many cases the bones have adhering to them portion of the indurated matrix, while the distinctive staining, and the positions in which the fossils were lying, often enabled one to determine the deposit from which they had been weathered. Nevertheless, all such specimens not secured *in situ* are labelled accordingly.

Structural differences of Tartangan Mussels, as compared with forms living in the locality. The most abundant *Unio* which occurs in beds A to E is a form comparable in many features with the living *U. vittatus*, but differing uniformly in having a relatively thicker shell. Typical *U. vittatus* is abundant in the adjacent lagoon, and occurs also in the Upper Beds of the island; measurements of this species from Tartanga lagoon, lagoons at Wongulla and Cockatoo Cliffs, Lake Borney and Devon Downs (layer i), etc., have been compared with those of a long series obtained from layer C in the Tartangan beds, and the results of a comparison of the greatest thickness of the marginal shell substance in the two forms are shown in the accompanying graph (fig. 8); in this the thickness is plotted against the umbo-ventral height, showing that the mussels from Tartangan beds have consistently thicker shells than those now living. The name *Unio (Hyridella) protovittatus* sp. nov. is therefore proposed for these thick-shelled individuals (fig. 9), and layer C at Tartanga is nominated as the typical horizon (Type and paratype, reg. no. P. 178, in S. Aust. Mus.).

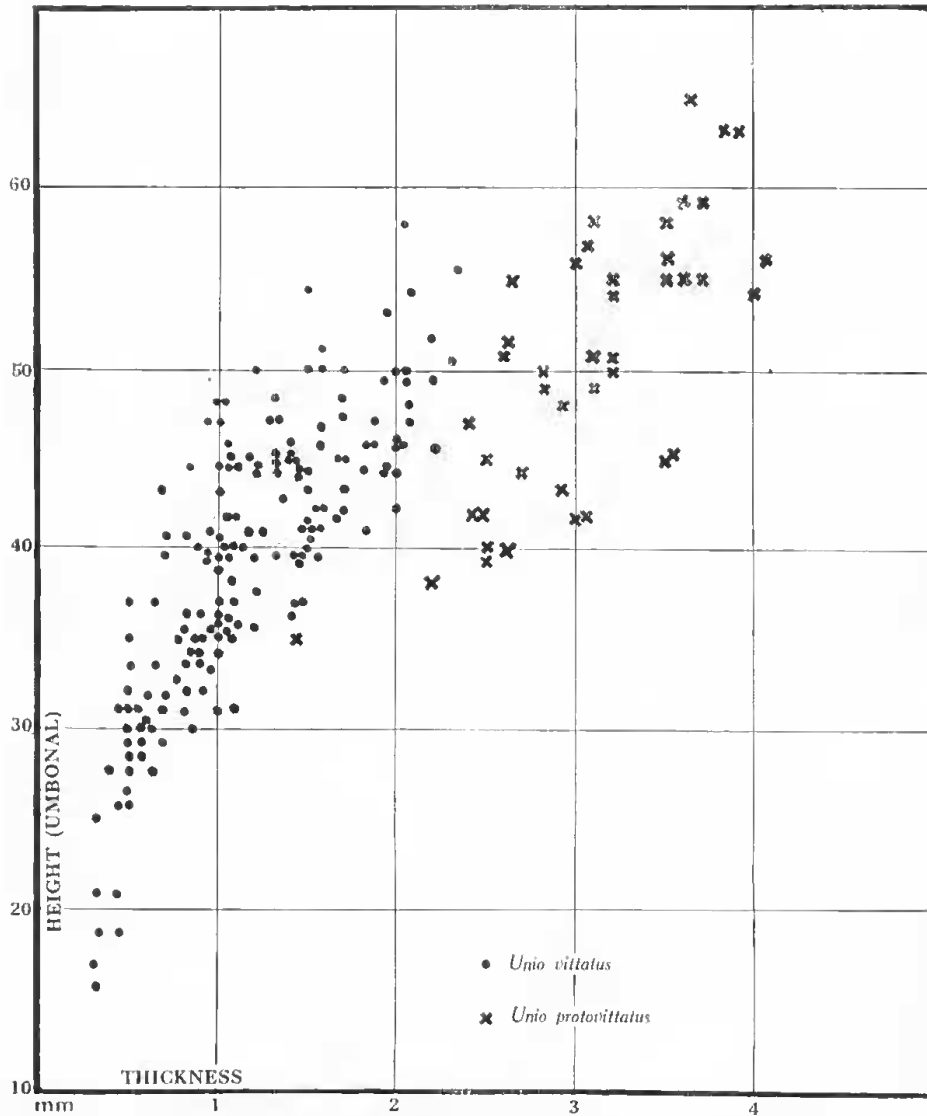


Fig. 8. Spot graph of *Unio vittatus* and *U. protovittatus*.

Another moderately common mussel in Tartangan beds is a thick-shelled *Unio*, which to-day occurs only in the deeper parts of the river, where it can be secured by dredging or diving; apparently it has not hitherto been recorded from the Lower Murray, although there are specimens in the South Australian Museum from several localities in the Upper Murray basin. It is comparable with *U. angasi* in many respects, but the latter has a much thinner shell.

Tartangan occupational evidence. The following is a detailed account of the material secured from each bed at Tartanga.

Bed A. At the place where the trench was cut the top of this sandy bed is 3 metres below the level of the present summit of the island, and 1.2 metres below the highest part of bed E. Bed A was penetrated for only a short distance

when excavating; in it are *Unio protovittatus*, and burnt stones suggestive of cooking-hearths.

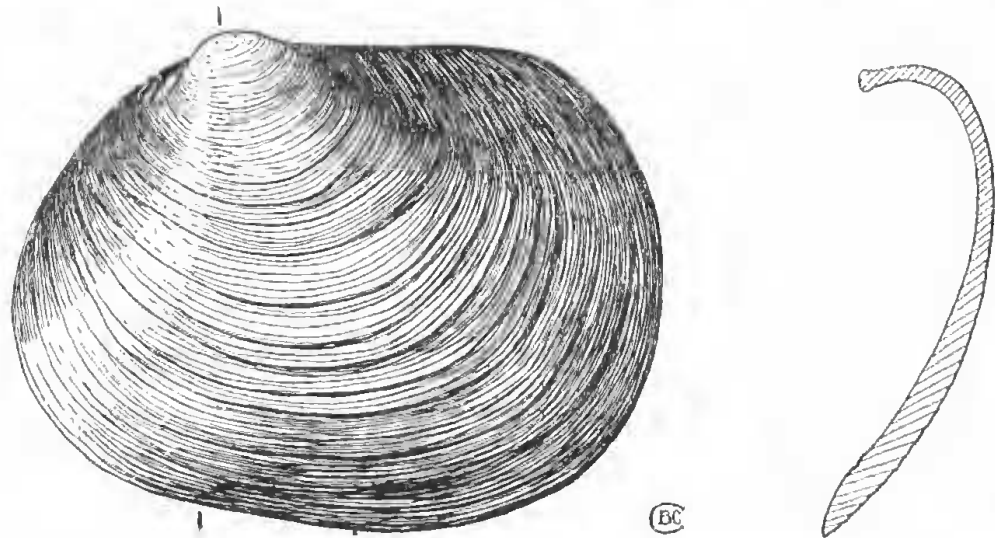


Fig. 9. *Unio (Hyridella) protovittatus* sp. nov. Composite drawing of two specimens from Layer C Tartagan Beds (nat. size).

Bed B. In this consolidated bed are burnt stones, and food debris consisting in the main of *Unio protovittatus* arranged in stratified layers; vertebrae and jaws of fish (comparable with living *Oligorus*) and bones of mammals (*Macropus*) and fresh-water tortoise (*Chelodina*) also occur. The bones are in most cases stained dark amber or almost black; some of the fish and tortoise bones from the lagoon beach were evidently weathered from this deposit, as they have this characteristic stain. Several stone chippings, or flakes, together with part of one striking bone implement were recovered. The last-named is the apical portion of a split long-bone which has been trimmed and smoothed (fig. 24).

Bed C. Bands of *Unio* and burnt stones are very abundant in this layer, and in places occupy the whole depth of the bed (fig. 10). The bone fragments are stained brown or, especially in the upper part, bluish-brown. The debris includes remains of the following:

MUSSELS: *Unio protovittatus* (type form); *U. cf. angasi* and *U. cf. umbiquus*.

UNIVALVE MOLLUSC: *Patulina hanleyi*.

FISH: *Oligorus cf. macquariensis* (large numbers of vertebrae and jaws; also vertebrae of smaller species); *Tandanus sp.*

TORTOISES: *Emydura cf. macquarii* and *Chelodina cf. longicollis*.

BIRDS: Unidentifiable fragments of bones.

MAMMALS: *Trichosurus cf. vulpecula* (Opossum); *Thylagale sp.* (Wallaby), and unidentifiable fragments of bones.

HUMAN REMAINS: (Tartanga No. iii) the skeleton first noticed by Mr. Roy was in this deposit.

ARTEFACTS: A few stone implements and many clippings.

Bed D. Thick *Unio* bands and burnt stones occur at many isolated places along the exposure of this layer. The bones are stained a dark brown (lower part) and bluish-brown (upper part).



Fig. 10. Dense pavement of *Unio* shells from Layer C, Tartangan Beds ($\frac{1}{2}$ nat. size).

MUSSELS: *Unio protovittatus* and *U. cf. angasi*.

UNIVALVE MOLLUSC: *Paludina hanleyi*.

FISH: *Oligorus cf. macquariensis*.

TORTOISES: *Emydura cf. macquarii* and *Chelodina cf. longicollis*.

MAMMALS: Similar unidentifiable material to that secured in bed C, with the addition of fragments of jaws and other bones of several large kangaroos, which Mr. H. H. Finlayson determines as *Macropus cf. giganteus* (p. 211).

HUMAN REMAINS: (Tartanga No. ii); portion of a maxilla, and three disassociated teeth, were disinterred from the uppermost level of this bed, directly beneath the site of a burial in layer E, mentioned below, while lying just above it was the right ramus of a lower jaw.

ARTEFACTS: Chippings and implements, chiefly of white quartz and white

chert, were present. In addition two large nether mill-stones and several smaller pounding and grinding stones were secured *in situ*. Other pounding stones, weathered out, were found lying loose on eroded areas of D.

Bed E. Bands of *Unio* shell and burnt stones continue in this bed. Bones in the lower levels are stained light brown, while those from upper limits are lighter coloured, in some cases with irregular dark staining.

MUSSELS: *Unio protovittatus* and *U. cf. angasi* (shell much broken and specimens suitable for identification rare).

UNIVALVE MOLLUSCS: *Paludina hanleyi* and *Bulinus pectorosus*.

FISH: *Oligorus cf. macquariensis* (very large vertebrae, etc.).

TORTOISE: *Emydura cf. macquarii*.

HUMAN REMAINS: (Tartanga No. i); an undisturbed but much fragmented skeleton was found in the lowest level of the deposit, embedded in a matrix of sand-rock containing debris typical of the layer.

ARTIFACTS: Intimately associated with the skull of the skeleton just mentioned were portions of four or more bone implements; one of these fragments was lodged near the mouth region of the skull. A few crude chert and quartz chippings were found in and on E.

UPPER BEDS (F to I).

Bed F. This is of relatively great thickness, and is composed of blue-black clay; the nature of the surface of such material would perhaps discourage its use as a camping ground, and the only evidence of native occupation so far recovered in it is a crude millstone. This was found during the excavation of the section, at a depth of 80 cm.

Bed G. Is formed of grey clay and is almost entirely barren. A single flake of irregular white quartz, exhibiting what may be poor attempts at secondary chipping, was secured during the cutting of the section.

Bed H. In this level, which is composed of sandy clay, there are numerous signs of intensive occupation in the form of *Unio* hearths, ash, etc., in places forming thick stratified layers.

By sieving six cubic metres from the upper parts of the bed we obtained a long series of the thin-shelled *Unio vittatus*, resembling living examples and quite distinct from the thick-shelled *U. protovittatus*. The epidermis still remained on some, but on exposure to air this frequently peeled off. A single shell of *Unio angasi* (thin type) and a few fragments of tortoise bone were also found; the bones are not mineralized.

'High-backed' chert implements and hammer-stones collected from the surface of this and the preceding bed are possibly weathered from one or the

other of them. The high-backed artefacts are worn discoidal scrapers of the type called "tula" by living natives of the Wonkanguru tribe of the Lake Eyre district in northern South Australia.

Bed I. The surface of this sandy level now forms the top of the island and the river bank. It is strewn with broken mussel shell and other signs of recent aboriginal occupation. A few handmills were secured, but no definite stone artefacts; as usual on modern Murray sites there were relatively few stone chippings.

HUMAN REMAINS.

Tartanga No. i. The broken right parietal of this individual was protruding from the weathered surface of the bottom of bed E, at a point 80 metres east of the cut section (figs. 4-5). When the matrix was cleared it became evident that the body had been buried from an upper level of this bed and had been placed in a shallow grave; the surface surrounding the exposed part of the skull was comparatively soft owing to weathering, but the matrix in which the bones were solidly embedded was homogeneous below with the rest of the lower part of the bed. The skeleton was lying at full length on the back with the head to the north-east. The right arm was sharply flexed, with the clenched hand in front of, and 10 cm. from, the face; the left arm was lying alongside the body, with fragments of the finger bones in the pelvic region.

Owing to weathering the face of the bed was here irregular and sloping, so that the limbs and thorax were approximately 30 cm. below the surface. The skull had been displaced to one side and, like the other bones, had partly decomposed and become greatly fractured before consolidation of the matrix occurred, as is evidenced by the fact that the spaces between broken and slightly disassociated fragments were filled with a hard limy cement. The major part of the cranium and facial skeleton, the right hand and arm, fragments of the left arm, portions of some ribs, most of the pelvis, and fragments of vertebrae and leg bones, were recovered. The lower jaw was missing.

Owing to the fractured condition of the skull, a block of the consolidated material enclosing it was embedded in paraffin wax and brought to the Museum for development. The removal of the fragments from the sand-rock occupied much time. The brain-cavity was found to be filled with fine sand, consolidated with a limy cement which, where in contact with the bones, formed a hard layer 1 cm. in thickness, from which it was difficult to separate the skull fragments.

The following measurements are some of those recommended by Martin (1928, ii, p. 625 *et seq.*) and his reference numbers are shown in the first column of the table. Owing to the absence of the left temporal, the left malar, the lateral parts of the parietals and the basal portions of the occipital many of

the conventional measurements cannot be secured, and others (where only one side is preserved) can be only estimated. Where estimations have been necessary in order to provide an approximate measurement, the result is marked with an asterisk.

Martin's Nos.	Tartanga I.
1. Greatest skull length [g-op]	189
2. Glabello-inion length [g-i]	181
3. Glabello-lambda length [g-l]	187
8. Greatest skull breadth [eu-eu]	135
9. Smallest frontal breadth [ft-ft]	103
10. Greatest frontal breadth [co-co]	117*
11. Bi-auricular breadth [au-au]	128*
12. Greatest occipital breadth [ast-ast]	107*
13. Mastoid breadth [ms-ms]	106*
20. Ear-bregma height [po-b]	114
26. Median sagittal frontal arc [n-b]	129
27. Median sagittal parietal arc [b-l]	133
28 (1). Median sagittal supra-occipital arc [l-i]	62
29. Median sagittal frontal chord [n-b]	115
30. Median sagittal parietal chord [b-l]	118
31 (1). Median sagittal supra-occipital chord [l-i]	60
44. Bi-orbital breadth [ek-ek]	102*
45. Bi-zygomatic breadth [zy-zy]	130*
46. Middle facial breadth [zm-zm]	81
48. Upper facial height [n-pr]	55
50. Anterior inter-orbital breadth [mf-mf]	24*
51. Orbital breadth from maxillo-frontal suture [mf-ek]	41 right
52. Orbital height	30 right
54. Nasal breadth	25
55. Nasal height [u-us]	43*
57. Smallest breadth of nasal bone	13*
57 (1). Greatest breadth of nasal bone	20*
60. Maxilla alveolar length	62*
61. Maxilla alveolar breadth	67
62. Palatal length [ol-st]	52*
63. Palatal breadth	39
72. Profile angle [n-ns]	10°*
73. Nasal profile angle [n-ns]	6°*
74. Alveolar profile angle [us-pr]	18°*
Area of palate	3600*

Martin's Nos.	INDICES.					Tartanga f.
Length breadth index	72
Length-auricular height index	60
Transverse frontal index	88
Transverse fronto-parietal index	76
Sagittal fronto-parietal index	103
Sagittal frontal index	89
Sagittal parietal index	89
Convexity index of supra-occipital			97
Upper face index	42
Orbital index	73
Nasal index	58
Maxillo-alveolar index	108
Palatal index	75

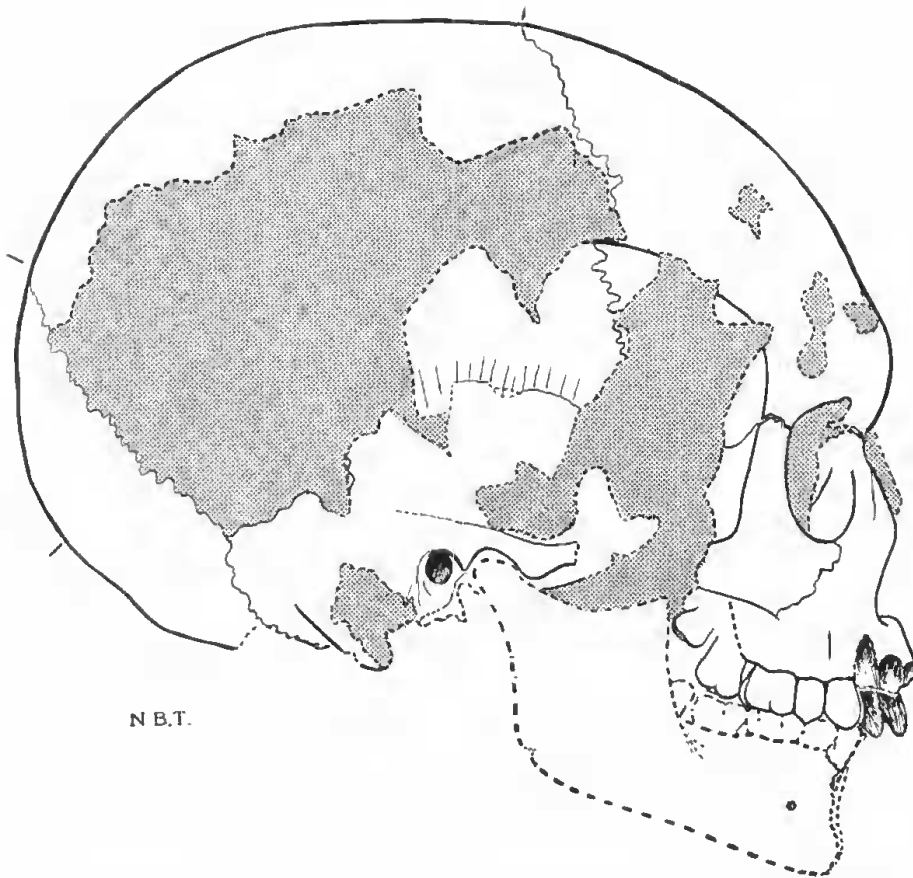


Fig. 11. Skull of Tartanga i from Layer E, Tartangan Beds, *norma lateralis* on Frankfort Horizontal; lower jaw of Tartanga ii indicated in dotted outline ($\frac{1}{2}$ nat. size).

The accompanying illustrations (figs. 11-15) have been drawn with the aid of the dioptograph of Lucae. Because of its greater completeness it has been considered more satisfactory to illustrate the right lateral aspect than the left. The principal vacuities in the cranium are shown; superficial surface injuries and fracture lines have been omitted.

Dentition (T. D. Campbell). *Tartanga i* has the upper jaw region well preserved, but the mandible is absent. Missing fragments and some distortion of one side of the upper jaw make it difficult to obtain accurate measurements of the palato-alveolar features, but as many as possible have been made and are incorporated in the general table.

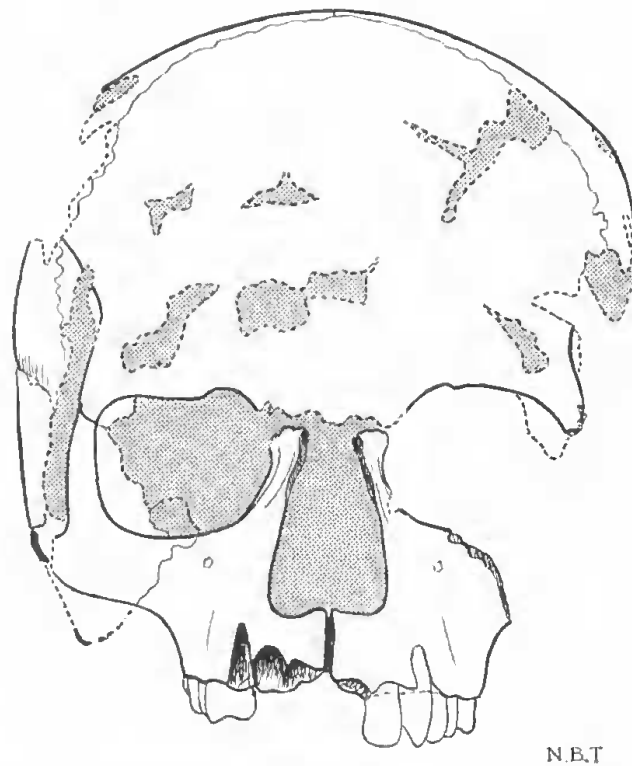


Fig. 12. *Tartanga i*, *norma frontalis* on P.II. ($\frac{1}{2}$ nat. size).

The upper teeth of the left side, with the exception of the central incisor are present; the third molar was *in situ*, but had not descended into its place in the arch. On the right side only the molars and premolars are present; on this side also the third molar had not erupted. The teeth are large and well formed, and all but the unerupted third molars are above the average measurements recorded for individual teeth of Australian aborigines. The second incisor is equal to the maximum recorded.

The development of the teeth suggests that the age of this individual was from ten to twelve years. Attrition has only moderately reduced the cusp levels (stage i, Broca); somewhat less than might be expected in a native of this age.

Tartanga No. ii. As previously mentioned portion of a left maxilla, the right ramus of a lower jaw, and three loose teeth (two molars and a premolar) of a youthful individual were disinterred from the top of bed D immediately underneath the position of the skull of Tartanga No. i (figs. 16–18).



Fig. 13. Tartanga i, *norma verticalis* on F.H. ($\frac{1}{2}$ nat. size).

The maxilla, together with fragments of *Unio protovittatus* was embedded in a hard concretionary nodule. The removal of the surrounding sand-rock to the depth of a few centimetres did not bring to light any further remains; further excavation in the consolidated material of D will be necessary before it can be determined whether other portions occur *in situ*. The facies is typical of bones from bed D; the maxilla is stained dark brown, and the teeth are orange to dark brown.

In an attempt to learn the degree of mineralization of these remains the weight of the portion of the ramus of the lower jaw was compared with that of five similarly shaped part jaws of recent aborigines and the ratio of increase in weight was found to be 1.0 : 1.5.

Dentition (by T. D. Campbell). The dental specimens of *Tartanga* No. ii include portion of the left maxilla, much of which is still enclosed in the matrix. With the exceptions of the central incisor and third molar all the

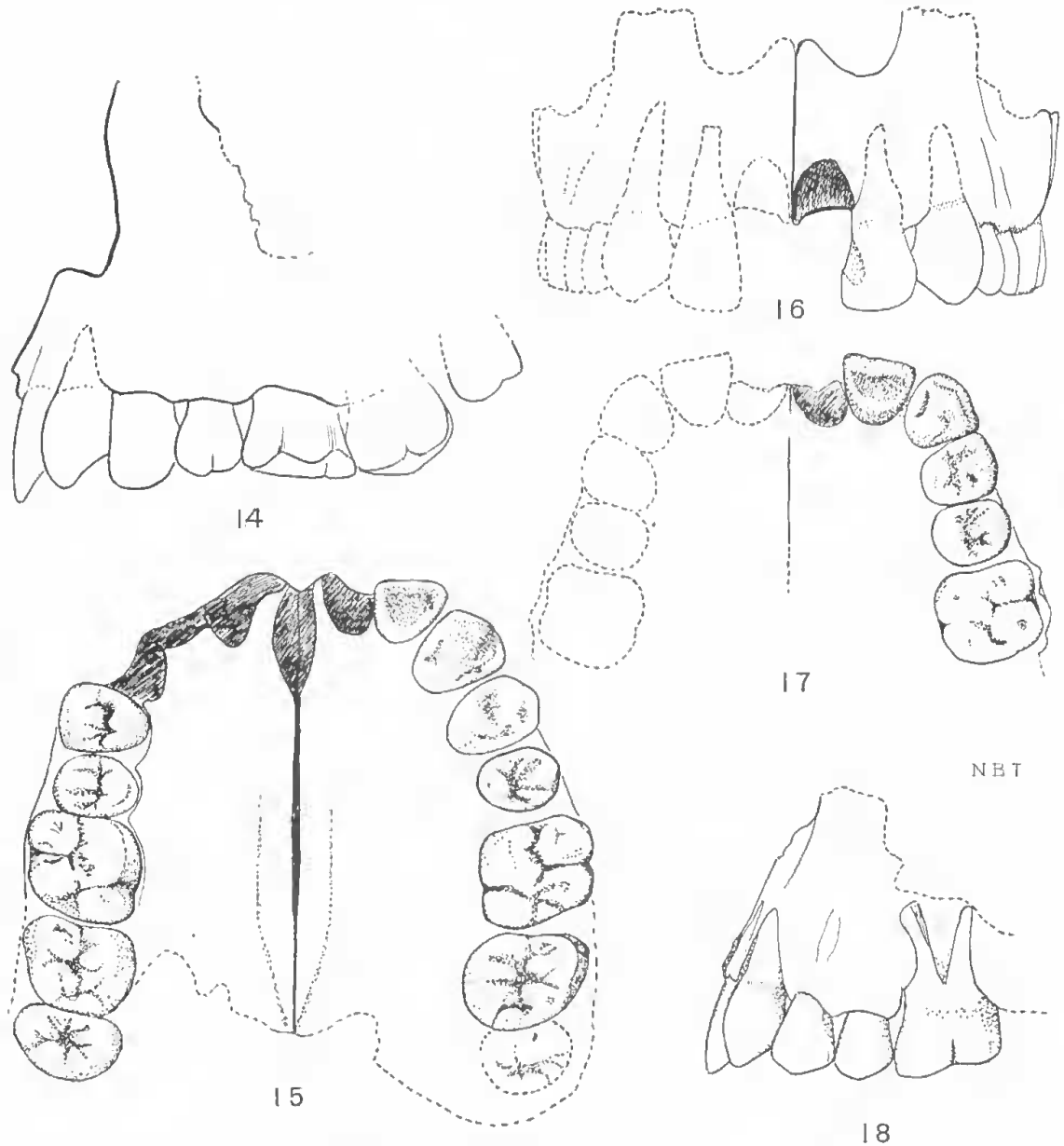


Fig. 14-15. Palate and maxilla of *Tartanga* i, Layer E, Tartangan Beds (nat. size).

Fig. 16-18. Fragment of maxilla of *Tartanga* ii, Layer D, Tartangan Beds (nat. size.)

teeth of the left side are present; the second molar was free when unearthed, and its place was occupied by matrix. A right upper third molar and the right portion of a mandible found nearby apparently also belong to the same individual. The lower jaw fragment is complete up to the first premolar, and all



Fig. 10. Skeleton of *Tartarua ibi*, in sandrock, as removed from Layer C, Tartaruan Beds ($\frac{1}{2}$ nat. size).

the teeth of the molar-premolar series are present; the socket of the first premolar contained the extremity of the root and was otherwise filled with matrix, while the rest of the tooth was found separately.

The condition of the teeth indicates an age of about twelve years. Attrition has almost obliterated the cusps of the first molar teeth, but the remainder are only slightly worn. The teeth are all large and well formed; there is a more marked crenation of the occlusal surface of the second and third molars than is usual in teeth of Australian aborigines.

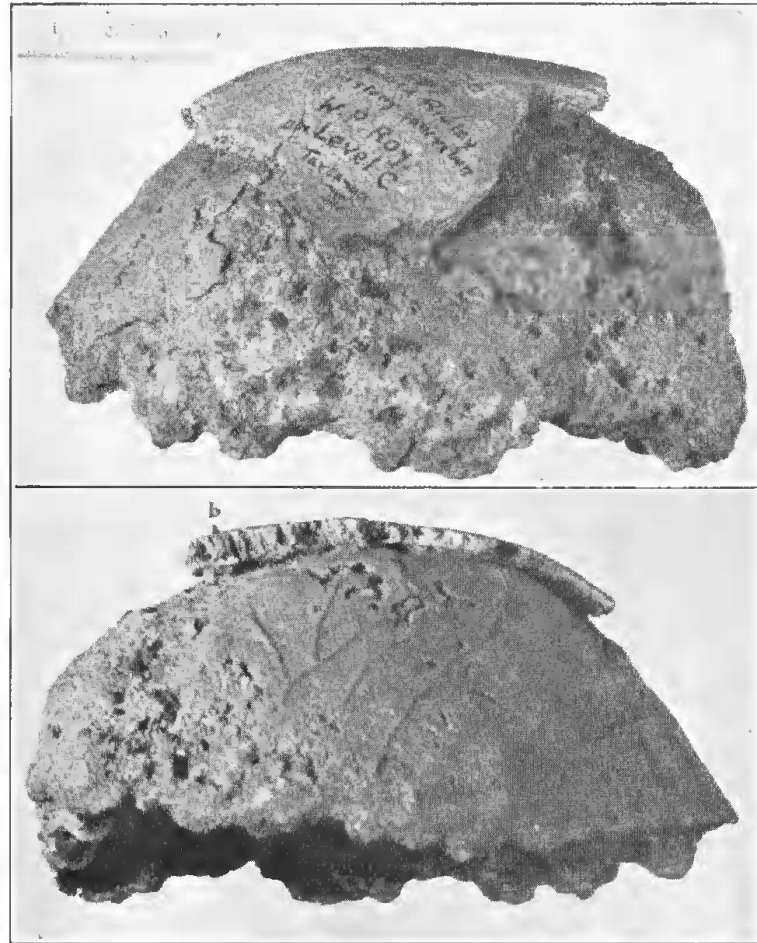


Fig. 20. Skull fragment of *Tartanga* iii, with stony endocranial cast; *norma lateralis*, right (top), left (bottom); b indicates *bregma*. Layer C, Tartangan Beds ($\frac{1}{2}$ ant. size).

Tartanga No. iii. These remains consist of the portion of calvarium discovered by Mr. Roy and the part skeleton subsequently removed from bed C, one metre east of the prepared section.

The stratification of densely packed *Unio* debris in the vicinity of this burial was well marked, and the cutting of a small section showed distinctly where

the excavators of the grave had disturbed the arrangement of the shell layers, leaving a record of their excavation of a grave little wider than was necessary to accommodate the body. The disturbed shell debris, sand, and ash was thrown back, and now, in a consolidated condition, surrounds the remains of the skeleton. The bones are stained similarly to others from the lower levels of bed C. The skeleton, which is being preserved in its matrix (fig. 19) is that of a youthful individual, and comprises the greater part of the trunk with the pelvis and proximal portions of the femora. Nodules partly embracing other bone fragments presumably belonging to this skeleton were secured by sieving debris on an adjacent terrace.

The body was buried from, apparently, the upper part of bed C, and was interred in an extended position with the head pointing to the south-west and the extremities to the north-east. As in Tartanga i, one arm (in this case the left) was flexed, with the hand resting just below the left shoulder, while the other arm was extended alongside the body, with the wrist on the right hip and the palm of the hand on the pubic region.

The skull fragment formerly associated with this skeleton consists of an irregular portion of the right parietal and a small part of the left parietal. This is adhering to a stony matrix, 1 to 2 cm. in thickness, which provides a partial endocranial cast of the greater part of the parietal region; before erosion there was evidently, as in Tartanga i, a soft core inside the harder material lining the skull cavity.

TARTANGAN ARTEFACTS.

As already mentioned, the term "Tartangan" is applied herein to material from beds A to E. No implements were found *in situ* in bed A; a few of the many white quartz and other chippings lying on the lagoon shore may have weathered from it.

Bed B. Two well-chipped, core-like implements from this level are shown in figs. 21-22; the material of one is dark yellowish chert, and of the other white chert. A well-shaped, high-backed implement of white chert (fig. 23) was lying on weathered B.

The apical portion of a single bone implement, fashioned from a piece of a split long bone of a mammal, belongs to this level (fig. 24). This is of the dark amber colour characteristic of bones from bed B, and has been shaped with bold cuts, but is crudely finished; it is illustrated with portion of the concretionary deposit attached.

Bed C. Crude high-backed implements of white chert exhibiting marked secondary working (figs. 25-27) are quite characteristic of this bed; in addition

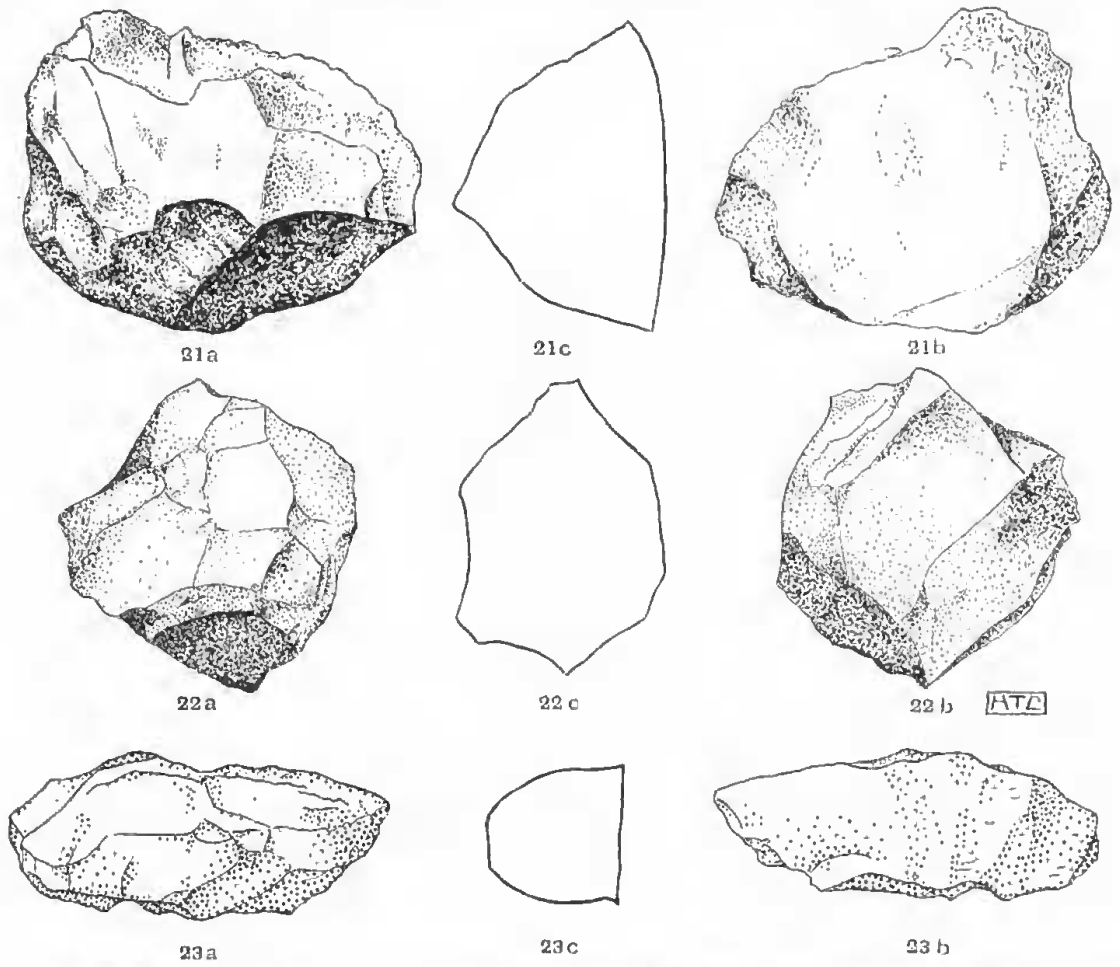


Fig. 21-23. Chert implements from Layer B, Tartangan Beds (nat. size); 21-22 *in situ*, 23 weathered out.

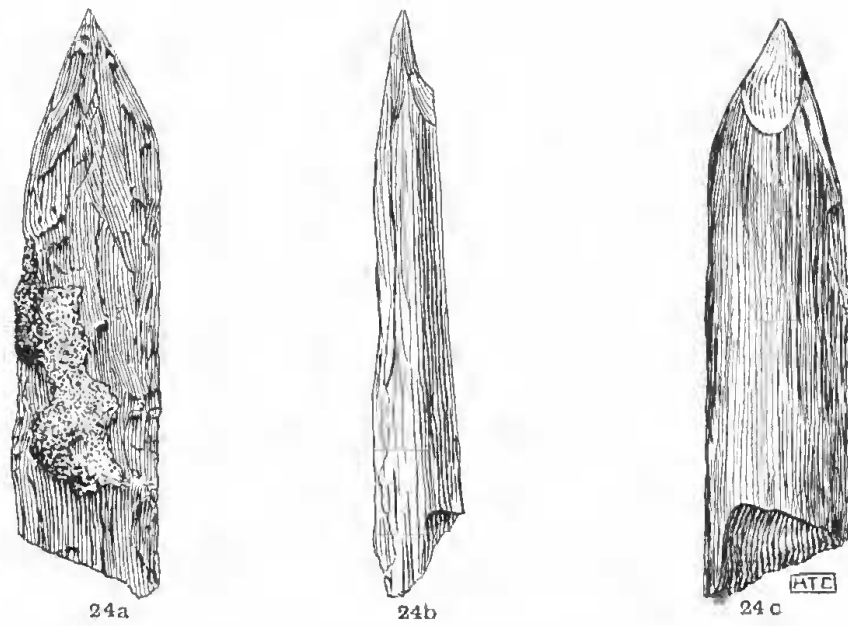


Fig. 24. Bone implement weathered from Layer B, Tartangan Beds (nat. size).

to those figured, numbers were obtained *in situ* and others were found loose on its weathered surfaces. All examples exhibit erosion or limy patination. Discoidal scrapers of the same material (fig. 28) may represent less used examples of similar type. Two larger core-like cherts, bearing indications of

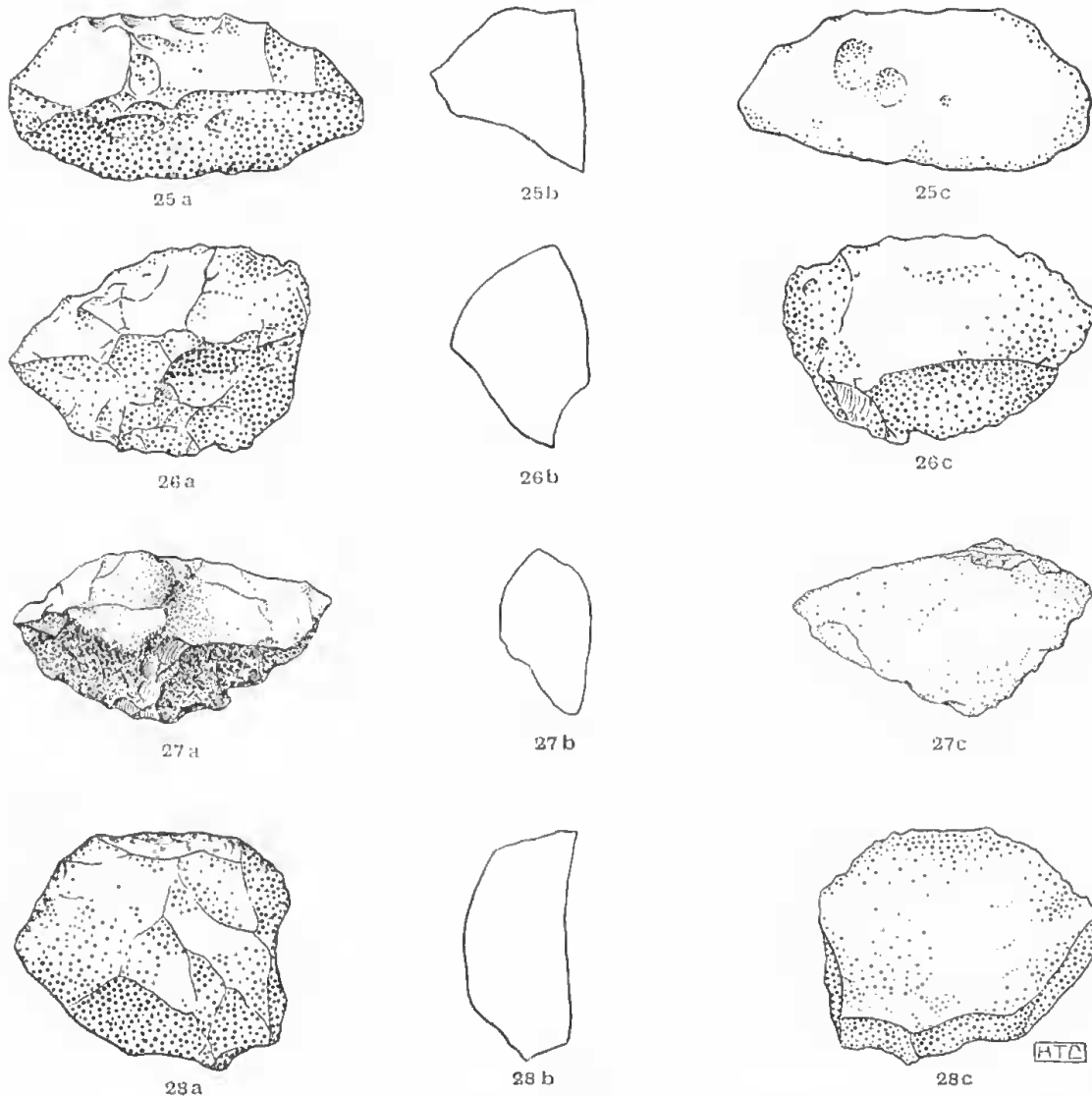


Fig. 25-28. Whitish chert implements from Layer C, Tartangan Beds; 25-27 *in situ*, 28 weathered out (nat. size).

secondary chipping, were found, that illustrated in fig. 29 *in situ* and that shown in fig. 30 on a weathered face. Much-used hammer-stones of quartzite, rose-quartz and white-quartz, and a tabular piece of phyllitic material (foreign to the locality) were taken from the bed.

Many amorphous flakes of quartz and white chert occurred in and on the bed; some have retouch chipping.

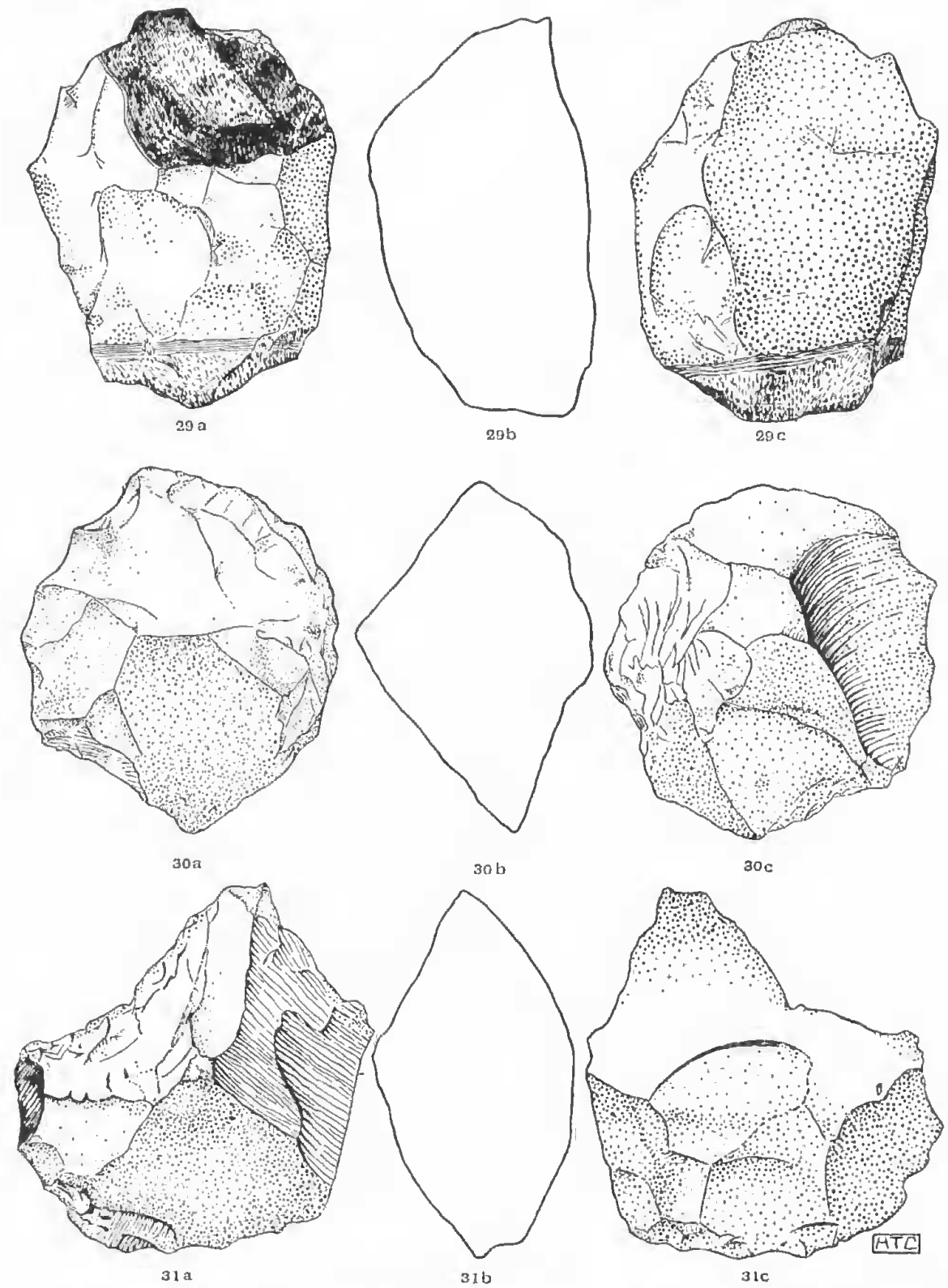


Fig. 29-31. Whittish chert implements from Layers C and D, Tartangan Beds; 29 banded and stained, found in C; 30 on weathered C; 31 *in situ* in D (nat. size).

Bed D. Implements taken *in situ* include a large white chert scraper (fig. 31) with retouch notches, one convex and one concave edge; this is perhaps the remnant of a much-used oval or discoidal scraper; also two hammer-stones (one of sandstone and the other of what appears to be siliceous limestone), and two large waterworn pebbles of sandstone, which have been used as lower mill-stones. In the bed and also on weathered surfaces were amorphous flakes of white and grey chert, and of white quartz, without secondary work.

Bed E. In this deposit were a small high-backed implement of grey chert (apparently burnt) and a crude discoidal scraper of white quartz, while a striking white chert tool was found on a weathered face, adhering to a mass of the deposit (fig. 32): this is of "parrot-beak" type and has much secondary work.

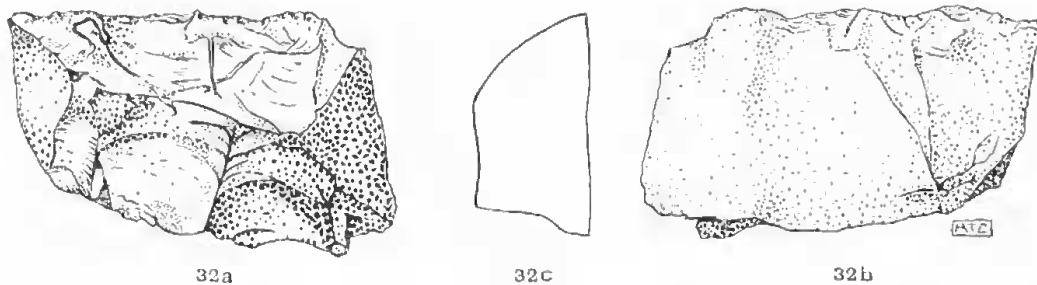


Fig. 32. White chert implement weathered from Layer E, Tartangan Beds (nat. size).

As already indicated, portions of five bone implements were associated with the skeleton of *Tartanga i*. Three of these are of the same type, namely, split-bone points; in one the apical part is intact (fig. 33), and shows that the bone has been scraped to a point and the latter polished. It was lying in front of the face of the skeleton, at the extreme bottom of the bed. Near it was a shorter example, the point and side of which were broken during excavation; otherwise the specimen is intact, and its base exhibits a deeply cut, acute notch (fig. 34). The third fragment was lying in the roof of the palate; were comparison with the two associated points not possible it would scarcely be recognizable as part of an implement, save for the fact that scraping marks are apparent (fig. 35).

When the block of matrix containing the skull of *Tartanga i* was lifted, two portions of a long, slender, pointed "round-bone" implement (fig. 36) were found lying on the uppermost level of bed D: the impression of one part is still retained in a piece of the matrix formerly covering the outer face of the left parietal. This implement has been scraped to a point, the dressing being on one side only, so that the marrow cavity is exposed some distance below the

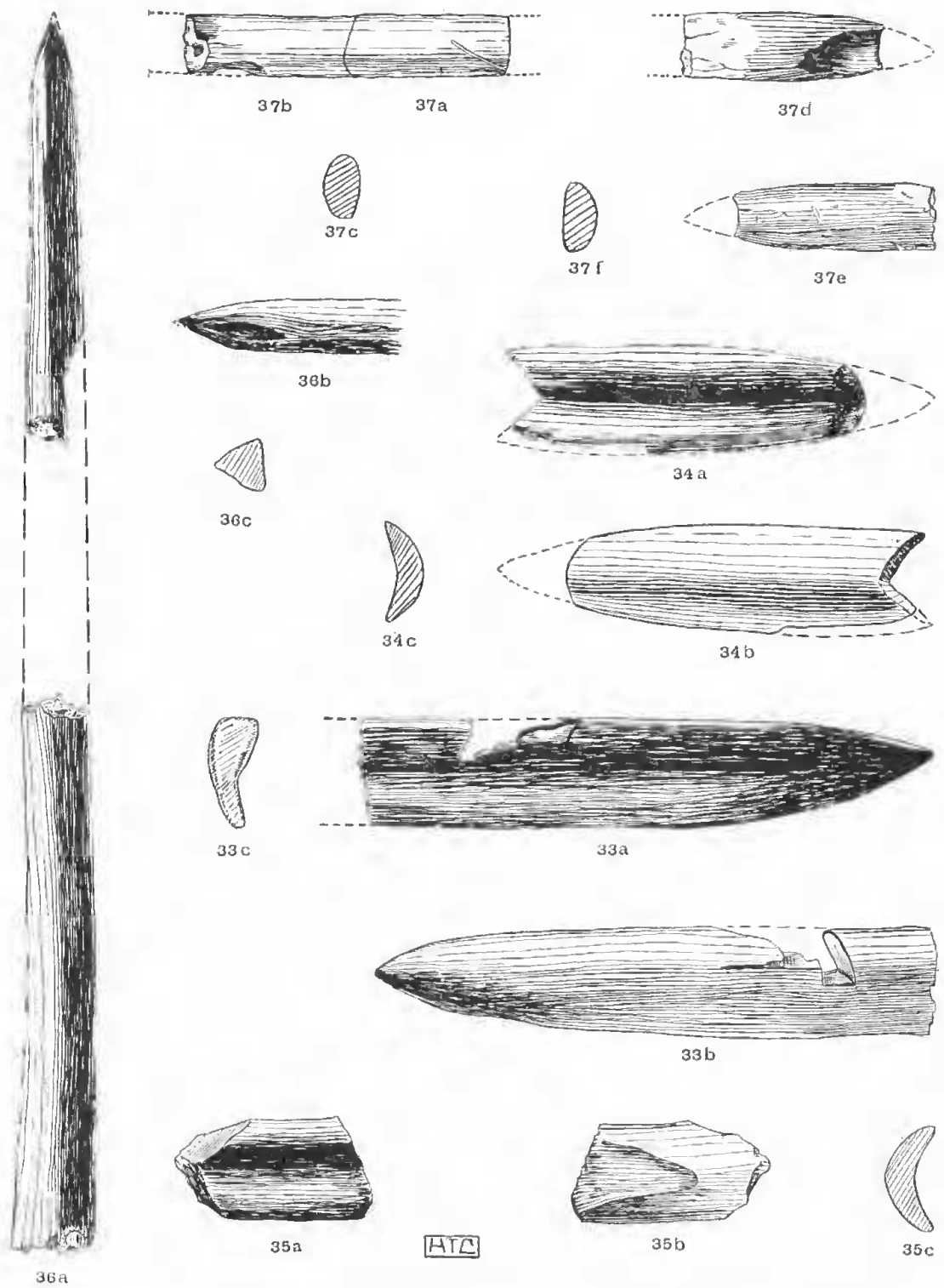


Fig. 33-37. Bone implements from Layer E, Tartangan Beds, all *in situ* (nat. size).

point (fig. 36, b). A small fragment of what is presumably a long point of similar type was adhering to the inside face (uppermost when found) of the right ramus of the mandible of *Tartanga ii* (fig. 37, a), and a further portion

(fig. 37, b), showing signs of an ancient break, was found in the sieve, and is now united to the fragment first found; what may be the extremity of this artefact was removed from a nodule present nearby (fig. 37, d-f).

UPPER BEDS ARTEFACTS.

Bed F. The aforementioned mill-stone was the only native handiwork located. According to Mr. A. R. Alderman this is a piece of an altered basic igneous rock, probably a lamprophyre. A similar rock occurs as a basic dyke in the Mamm Granite (forty kilometres to the south-west) and elsewhere in the Pre-Cambrian series.

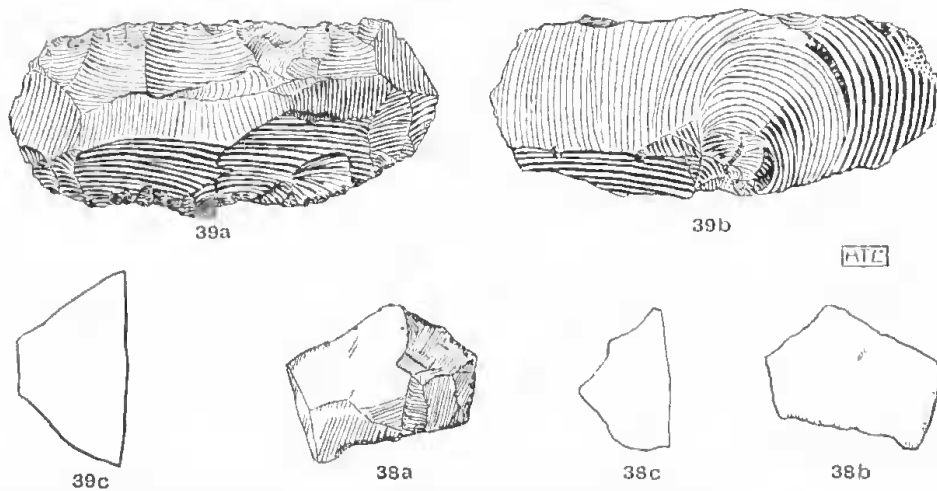


Fig. 38-39. Stone implements from Upper Beds, Tartanga; 38, quartz, *in situ*; 39, rudy chert, on surface (nat. size).

Beds G to I. An amorphous white quartz chipping, exhibiting what seems to be retonch (fig. 38), was excavated from a depth of 30 cm. in bed G. No implements were found in either of beds H and I, although simple flakes occurred on the surface. On the surface of G and H were two elongate scrapers (or worn *tulu*), one of yellow chert, the other (fig. 39) of dark rudy coloured chert; both show marked secondary work, but neither is eroded or patinated as are implements from Tartangan beds.

III. DEVON DOWNS SHELTER.

LOCALITY.

The Devon Downs cliff-shelter is on the north-eastern boundary of Section 89, Hundred of Nildottie (figs. 2 and 7); the now abandoned old Devon Downs Station, from which it has received its name, is situated on the opposite bank of the river.

The shelter was described and figured by Sheard (1927). It faces due north (not west, as stated in Sheard's description), and is partly the result of aerial erosion of soft strata of the limestone cliff, which at this point is about 30 metres in height.

The occupational detritus is highest against the wall of the shelter, where it is 7 metres above water level (low river, November 22, 1929). The talus extends outward from the shelter with increasing slope to the river margin 25 metres distant (see fig. 40).

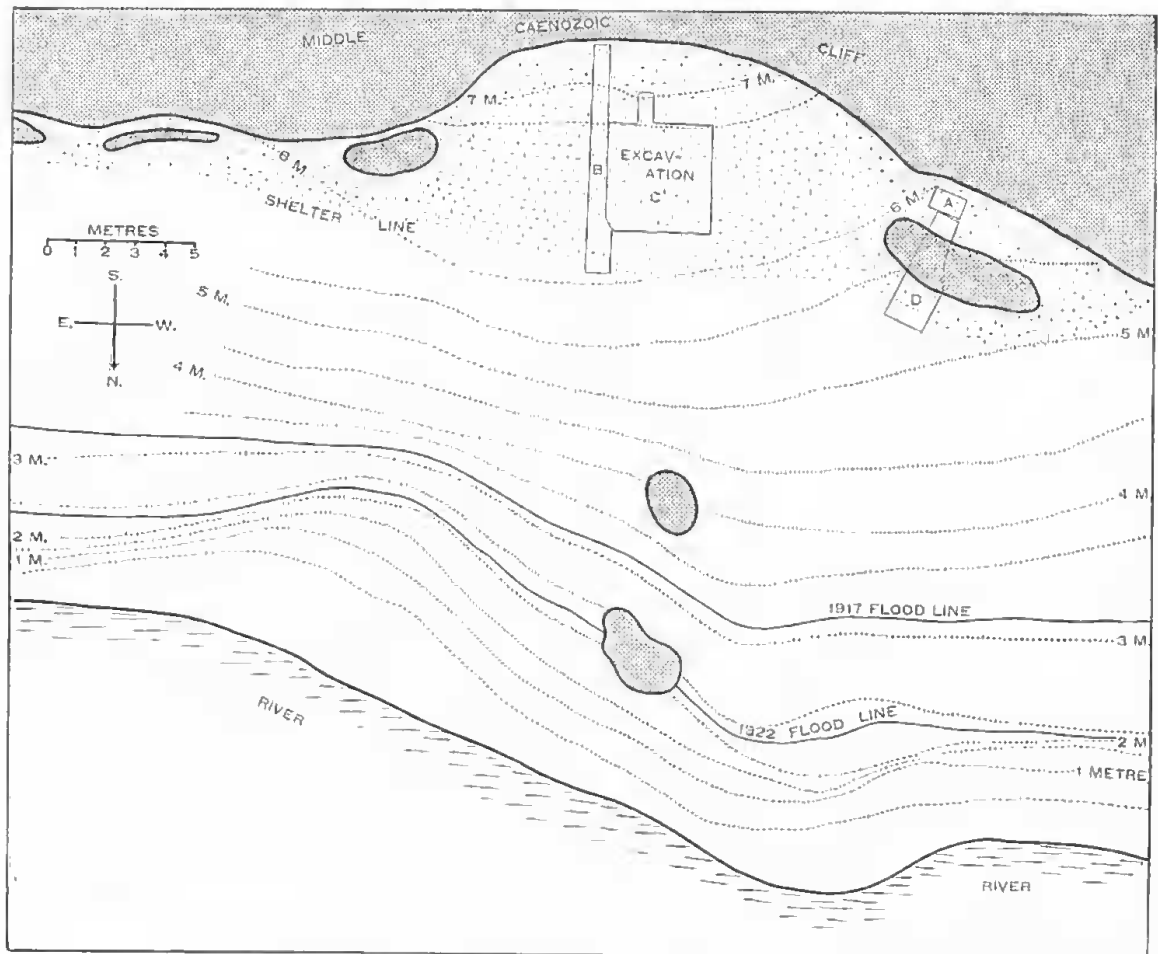


Fig. 40. Contoured plan of Devon Downs Shelter and its talus, May, 1929 (A, Sheard's excavation, 1927; B-D, South Australian Museum excavations, 1929).

At the western end of the shelter a large rock projects above the surface of the stratified debris. This block has fallen away from the rock forming the present roof and back. Sheard made a small excavation (fig. 40, at A) between this rock and the wall, and states that "The floor to a depth of 3 feet is composed of old fires and a small amount of detritus. . . . One crude upper mill-

stone and a few rough flakes were observed, these being the only native implements discovered."

METHODS OF EXCAVATION.

During our preliminary excavation of a narrow trench (fig. 40, at B) to a depth of 5 metres in May, 1929, the material was removed in horizontal layers 10 cm. in thickness, the area being divided into rectangles the width of the trench (50 cm.) and 1 metre in length. An analysis of the results, and the preparation of plans, indicated that the stratified material could be conveniently divided into series of broader bands, well defined owing to differences in appearance and constitution (fig. 41).

In carrying out the second and larger excavation, in November and December, 1929 (fig. 40, at C'), the debris was removed in twelve successive layers (conforming strictly to the stratifications previously noted) to a depth of 6.2 metres. This brought to light four superimposed cultural phases, here termed, in descending order, Murundian, Mudukian, Pirrian, and Pre-pirrian (see p. 203).

Within the shelter the surface of the talus was covered with a layer of disturbed and unstratified loose sand and ash, varying from 10 to 30 cm. in depth. This material was removed over a large area before digging operations were commenced.

Small miners' picks, a shovel, trowels, bellows, and brushes were used in the removal of the material. The ashy debris was lifted in buckets, and at the lower levels it was necessary to employ block and tackle. Excavated material was placed on a large mat, and after preliminary examination was passed through sieves with a mesh of not more than 4 mm.

The proportion of occupational material, as apart from the ash, was surprisingly large, often more than one-fourth being retained by the sieves. At all levels the bulk of residue was made up of broken shell, but many hundreds of fragments of bone occurred in each; in the lists the only animals enumerated are those of which easily recognizable remains are available, such as jaws, teeth, part skulls, vertebrae, statoliths of fish, etc.

Gastroliths of fresh-water crayfishes (*Parachaerops bicarinatus* and *Astacopsis serratus*) are abundant in the upper levels, and the tips of chelae of these crustaceans are also present. The gastroliths are indicative of but a proportion of the crayfish consumed, for these "stomach-stones" are present only at periods of ecdysis.

Records were kept of the total numbers of small Molluscs incidentally

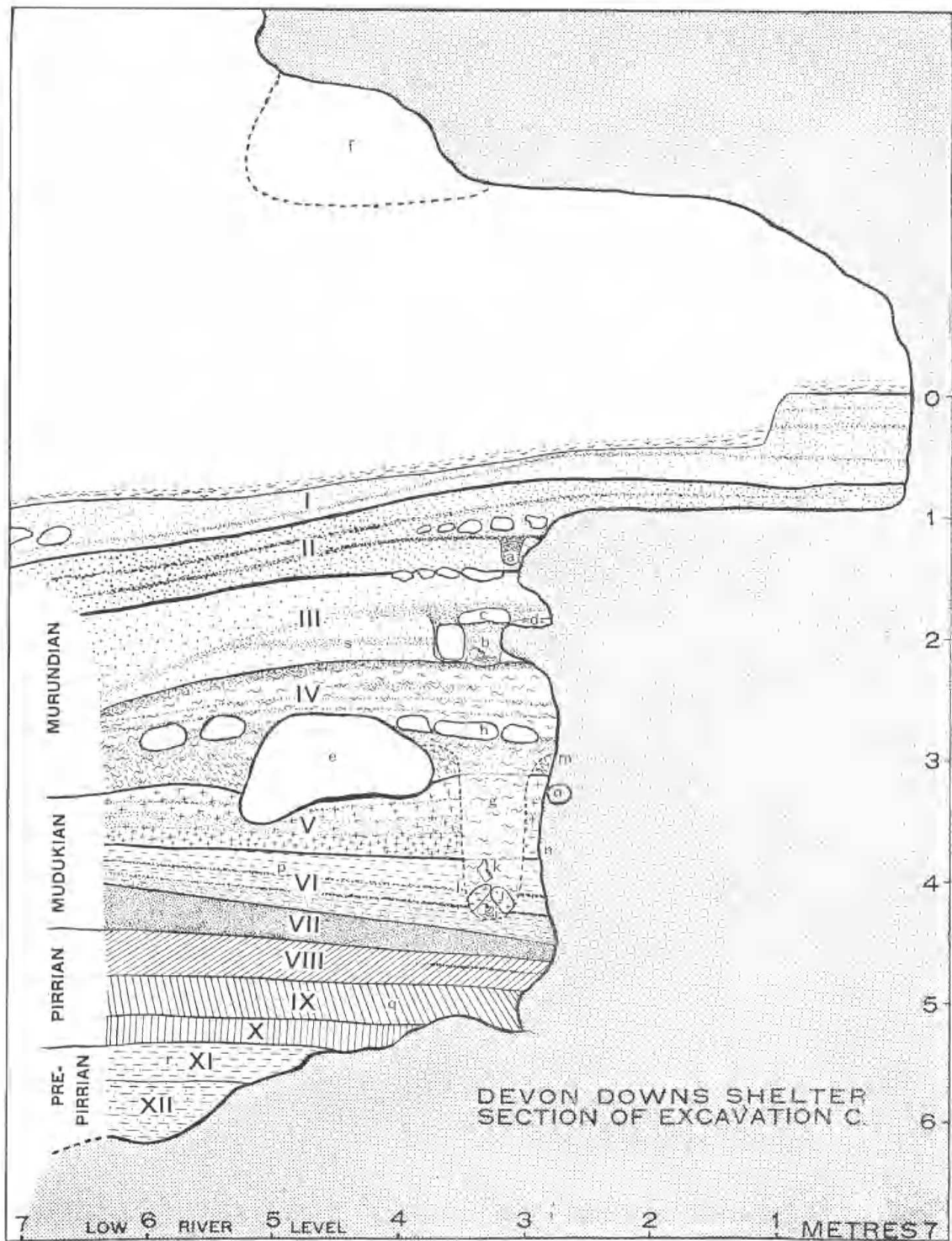


Fig. 41. Section of the deposits in Devon Downs Shelter. (a) Infant burial from the 120 cm. dark band; (b) child burial from the middle iii land surface; (c) block of limestone used as a mill-stone and inverted to form a grave capping; (d) packet of debris, an outlier of Layers V-VII; (e) big rock which fell on top of Layer V; (f) its former position on roof of shelter; (g) grave excavated from the brown layer of IV; (h) stones capping the grave; (i) broken skull and bones of the child buried from the brown level; (j) consolidated blocks of upper V used as grave lining; (k) lower jaw of a five-year-old child disturbed from Layer VI and reburied with the Layer IV child; (l) teeth of five-year-old child in apparently undisturbed VI; (m) upper limit of sharpening marks on wall; (n) lower limit of same; (o) position of bone implement in hole in wall; (p) *Sarcophilus* teeth; (q) *Sarcophilus* jaw; (r) deciduous human incisor; (s) geminate deciduous human incisor.

present in each layer; these numbers have been plotted, together with an indication of the average thickness of each level (p. 214).

Statistics were also kept of the approximate numbers of stone implements and unworked flakes and of the types of material utilized in each level. The materials here referred to as "chert" comprise fine-grained siliceous rocks of chert, flint, and opal types. These cherts exhibit a great range of colour, but in all levels a dull grey to yellowish flinty-chert is by far the most abundant.

DESCRIPTIONS OF LAYERS I–XII.

Layer I (Late Murundian). A white to yellow limy layer from 15 to 75 cm. in depth. It contains much ash and numbers of occupational horizons indicated by dense *Unio* hearths, burnt stones, and dark brown bands. The uppermost levels are preserved only in the back of the shelter. There is a layer of broken *Unio* shells at the base of this bed, lying on a comparatively sterile and continuous chocolate-coloured band (from 3 to 10 cm. in thickness), which forms the top of the writers' layer II.

The *Unio* shells have retained the whole of their epidermis; animal bones are unaffected, and partly charred plant remains, such as stems of sedges, have not completely perished.

MUSSELS: *Unio villatus*, *U. angasi*, *U. ambiguus*, and *Corbicula anyasi*.

UNIVALVES: *Melania balannensis*, *Paludina hanleyi*, and *Bulinus texturatus*.

CRAYFISH: *Parachraeps bicarinatus* and *Astacopsis serratus*.

FISH: *Oligorus marquariensis* (Murray Cod) and *Tandanus tandanus* (Cat fish); vertebrae and spines of other fishes.

TORTOISE: *Chelodina longicollis*.

SNAKE: *Python spilotes*.

LIZARDS: *Tiliqua* and *Amphibolurus*.

MAMMALS: *Isodon* cf. *obtusus* (Short-nosed Bandicoot), *Perameles* cf. *myosura* (Banded Bandicoot), *Trichosurus* cf. *vulpecula* (Common Opossum), *Bettongia* (Rat Kangaroo), *Potorous* (Rat Kangaroo), *Lagorchestes* cf. *leporoides* (Hair-wallaby), *Macropus* (Kangaroo), *Lasiornhinus* (Wombat), *Rattus* (Native Rat), and *Canis familiaris* (Dingo).

PLANTS: Sedge stems and *Eucarya acuminata* (Quandong stones).

ARTEFACTS: One worn oval quartzite hammer-stone, a few quartzite chip-pings, and two dozen nondescript flakes of variously coloured chert: also red ochre of three shades.

Layer II (Murundian). Varies in thickness from 20 to 80 cm. The upper limit is a thin chocolate-coloured continuous band. Below this are yellowish ashy deposits containing a rock-fall, two continuous beds of darker concentrated ash,

and numerous lenticular hearths of the same material. Below the outer part of the shelter the lower limit of the layer is defined by a fall of limestone boulders which sealed lower deposits. In the inner part of the shelter the material of this layer lies directly on a rocky shelf (see fig. 41). The epidermis is sometimes retained on the *Unio* shells.

MUSSELS: *Unio vittatus*, *U. ambiguus*, *U. angasi*, and *Corbicula angasi*.

UNIVALVES: *Melania balonnensis*, *Paludina hanleyi*, *Bulinus texturatus*, *Xanthamelon cyrei*, and *Bulinus adelaidae*.

CRAYFISH: *Parachaeraps bicarinatus* and *Astacopsis serratus*.

FISH: *Oligorus macquariensis* and *Plectroplites ambiguus* (Callop).

BIRDS: *Dromaeus novaehollandiae* (Emu) and *Biziura lobata* (Musk-duck).

MAMMALS: *Phascogale* cf. *flavipes* (Yellow-footed Pouched-mouse), *Peromyscus*, *Trichosurus* cf. *vulpecula*, *Lagorchestes* cf. *leporoides*, *Thylogale* (Scrub Wallaby), *Macropus*, *Rattus*, and *Canis familiaris*.

PLANTS: *Eucarya acuminata*.

HUMAN REMAINS: In the south-western corner of the excavation, at a depth of 140 cm., the bones of a young baby (fig. 41, a) were unearthed. All were probably associated, but some were disturbed before their arrangement could be recognized. The shape of the grave was clearly traceable, and it was apparent that the infant had been buried from the level of the lower of the two dark bands of concentrated ash (at 120 cm.); the grave was intrusive on the bottom of layer II.

Dentition (T. D. Campbell). The teeth of this specimen form an incomplete deciduous set, consisting of thin calcified shells of the crown portions of the teeth. In the anterior teeth represented development has reached the stage of almost complete crown form as regards external dimensions; in the molar representatives only about two-thirds of the crown is calcified. The teeth comprise: complete upper set excepting the right lateral incisor and the left canine; the lower series is represented by two canines and two first molars. The stage of development suggests an age of about three months.

ARTIFACTS: One irregular fragment of bone scraped to a point, and with polished edges. One crude quartz scraper, rectangular in shape, with indication of retouch; twenty-three chippings of chert, five fragments of quartzite and two of micaceous schist. Small pieces of red and brownish ochre.

Layer III (Murundian). Is approximately 65 cm. in thickness. Its upper part consists of yellowish limy debris similar to that of II. In the middle there is a well-defined continuous greyish-black horizon about 10 cm. in thickness. In the lower half is another dark band, the outer part of which has been eroded away so that the upper black deposit, beyond this truncated band, rests directly

on the lowest level of the layer. A harder stratum of the cliff projected outward at the bottom of this level, forming a narrow ledge (fig. 41, d) with creviced and rugged upper surface. This bears a small amount of detritus characteristic of levels V to VII.

The principal mussels are thin-shelled *U. angasi*, *U. ambiguus* being rare. Two examples were recovered of a species apparently identical with specimens from Moonlight Creek and Connexion Island (Gulf of Carpentaria), and from Paradise Lagoon, Fitzroy River, N.W. Australia, labelled as "*U. stuarti* Adams and Angus"; also with others from Newcastle Waters, North Australia, labelled "*U. bednalli*, Tate." All shells are entirely without epiderm.

The bones from the yellow upper debris are paler in colour than the others, which are a deep brown.

MUSSELS: *Unio angasi*, *U. ambiguus*, *U. cf. stuarti*, and *Corbicula angasi*.

UNIVALVES: *Paludina hanleyi*, *Melania balonnensis*, and *Bulinus texturatus*.

CRAYFISH: *Parachacraps bicarinatus* and *Astacopsis serratus*.

FISH: *Oligorus macquariensis* and *Plectroplites ambiguus*.

BIRDS: *Dromaeus novae-hollandiae* and *Uraeetus undar* (Wedgetail-eagle).

SNAKE: *Python spilotes*.

LIZARDS: *Tiliqua* and *Amphibolurus*.

TORTOISE: Unidentifiable fragments.

MAMMALS: *Pseudochirus* (Ring-tailed Opossum), *Bellangia*, *Lagorchestes cf. leporoides*, *Macropus*, *Thylogale*, and *Rattus*.

PLANTS: *Eucarya acuminata*.

HUMAN REMAINS: Against the rock wall and near the middle of the width of the excavation, at a depth of 190 cm., a rectangular block of cliff limestone (50 cm. x 40 cm. x 20 cm.) was encountered (fig. 41, e). It proved to have on its lower surface a shallow circular depression, indicative of its use as a nether mill. It was uniformly covered with the greyish-black deposit, and above it were seals of the yellowish debris containing stratified *Unio*. Below the slab was the skeleton of a young child (aet. c. 15-18 months), lying on the right side in a partly flexed position with the head to the north-east. Examination showed that a grave 1 metre in length and 0.5 metre in width had been excavated to a depth of only 35 cm. from the (then) surface, and that on three sides stones had been placed as lining walls, the face of the previously mentioned projecting ledge of the back wall forming the fourth side. The slab of limestone was resting on the side-stones. It was evident that the vault had not been filled in before the slab was placed in position, for when uncovered it contained fine sifted dust of the greyish-black bed, and was not completely filled.

The almost complete skull (fig. 42), which is somewhat distorted, probably

through pressure of the large slab, and most of the other bones were recovered. These were stained rich brown. A few measurements of the skull are given.

Martin's No.

1.	Greatest skull length [g-op]	..	..	..	162
8.	Greatest skull breadth [eu-eu]	..	..	..	116
9.	Smallest frontal breadth [ft-ft]	..	..	..	83
10.	Greatest frontal breadth [eo-eo]	..	..	..	100
20.	Ear-bregma height [po-b]	..	..	..	100
	Length-breadth index	..	..	..	72
	Length-auricular height index..	..	..	..	62

A geminate deciduous human incisor was also found in this bed.

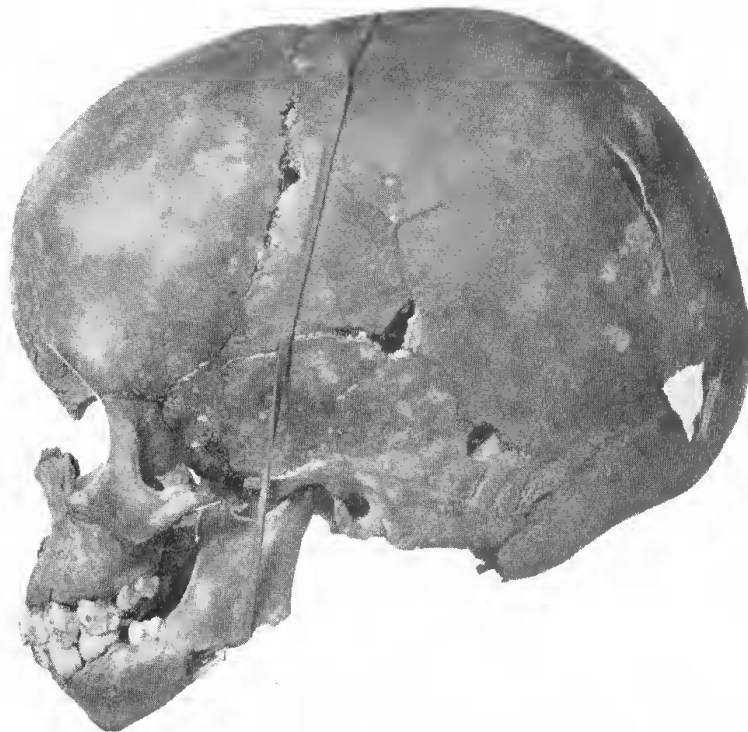


Fig. 42. Skull of child from Layer III, Devon Downs, *norma lateralis* ($\frac{1}{2}$ nat. size).

Dentition (T. D. Campbell). The distortion of the skull of the child from layer III, mentioned above, has not extended to the jaw region, which is markedly prognathous (fig. 42). The mandible is nearly complete, lacking only a small portion of the ventral margin of the left ramus.

The deciduous teeth are all present and are very large; the partly formed crowns of the first permanent molars are visible in their crypts, but are not readily accessible for examination. The dental condition suggests an age between fifteen and eighteen months.

A striking isolated find from this layer consists of an example of the rather unusual condition of gemination of the deciduous teeth. The teeth concerned are probably the lower left central and lateral incisors. There is complete fusion of the crown and root portions, with a vertical grooving labially and lingually, marking the junction; the root of the geminate tooth is considerably absorbed.

ARTIFACTS: A single mineralized double-pointed bone implement (elsewhere called a "*muduk*") of a type common in levels V to VII. This implement (fig. 154) was associated with a jaw of *Lagorchestes* cf. *leporoides* and a few other bone fragments, at a depth of 190 cm., on the aforementioned rocky ledge against the back of the shelter; the facies of these remains is characteristic of layer V and earlier. It may be surmised, therefore, that they represent a cache deposit on the ledge. No other bone implement was found in either layer III or IV.

Three crude discoidal scrapers, two of chert and one of quartz. Thirty non-descript chippings of chert, and twelve of quartz.

Layer IV (Early Murundian). Consists of a metre of alternating thin bands of yellow and grey to black deposits. The upper limit is defined by a uniform black band at 215 cm. There is a well-marked brown stratum, about 10 cm. in thickness, near the bottom of IV and immediately overlaying a thin black band. The bottom, where not covered by a large fall of rock, is defined by a white limy deposit forming the uppermost level of our layer V. In the area excavated this rock-fall consisted principally of a large block, of a maximum thickness of a metre, and occupied the greater part of the area of our excavation. The shape, position, and dimensions of this mass show that it has fallen from the roof of the shelter. Its former position can be clearly traced, and on the smooth surface of the hollow resulting from the detachment of it are "carvings" of one of the types described by Sheard (1927). The reddish colour of the upper surface of the fallen mass (due to burning) shows that it had been the site of numerous fires during the occupancy of the lowest levels of IV.

MUSSELS: *Unio angasi*, *U. ambiguus*, *U. vittatus*, and *Corbicula angasi*.

UNIVALVES: *Paludina hanleyi*, *Bulinus texturatus*, and *Melania batonnensis*.

CRAYFISH: *Parachacraops bicarinatus* and *Astacopsis serratus*.

FISH: *Oligorus macquaricusis* and *Tandanus tandanus*.

TORTOISE: *Chelodina longicollis*.

LIZARD: *Tiliqua* and *Varanus* cf. *gouldii*.

BIRDS: *Dromaeus novaehollandiae*.

MAMMALS: *Isodon* cf. *obsoletus*, *Pseudochirus*, *Bettongia*, *Lagorchestes* cf. *leporoides*, *Macropus* cf. *giganteus* (Grey Kangaroo), *Thyllogale*, *Lasiorhinus* or *Phascogomys* (Wombat), *Rattus*, and *Canis familiaris*.

PLANTS: *Eucarya acuminata*.

Of the mussels *U. angasi* is very common, *U. ambiguus* moderately plentiful, and *U. villatus* rare.

HUMAN REMAINS: In the "brown level" were some white limy nodules (containing light-coloured remains of various animals), which proved to belong to layer V and to have been thrown out on the surface of this deposit during the excavation of a deep grave transgressing layer V and part of VI (fig. 41, h, i). The greatest length of the grave was one metre and its breadth half a metre, and it was situated lengthwise against the back wall of the shelter in the only part not sealed by the big rock-fall. It was traced downward to 430 cm. from datum, where it was found to contain a child's skeleton protected by a few large blocks of limy material (fig. 41, j), which proved to be consolidated pieces of the white deposit in layer V. In the mixed debris filling this grave an almost

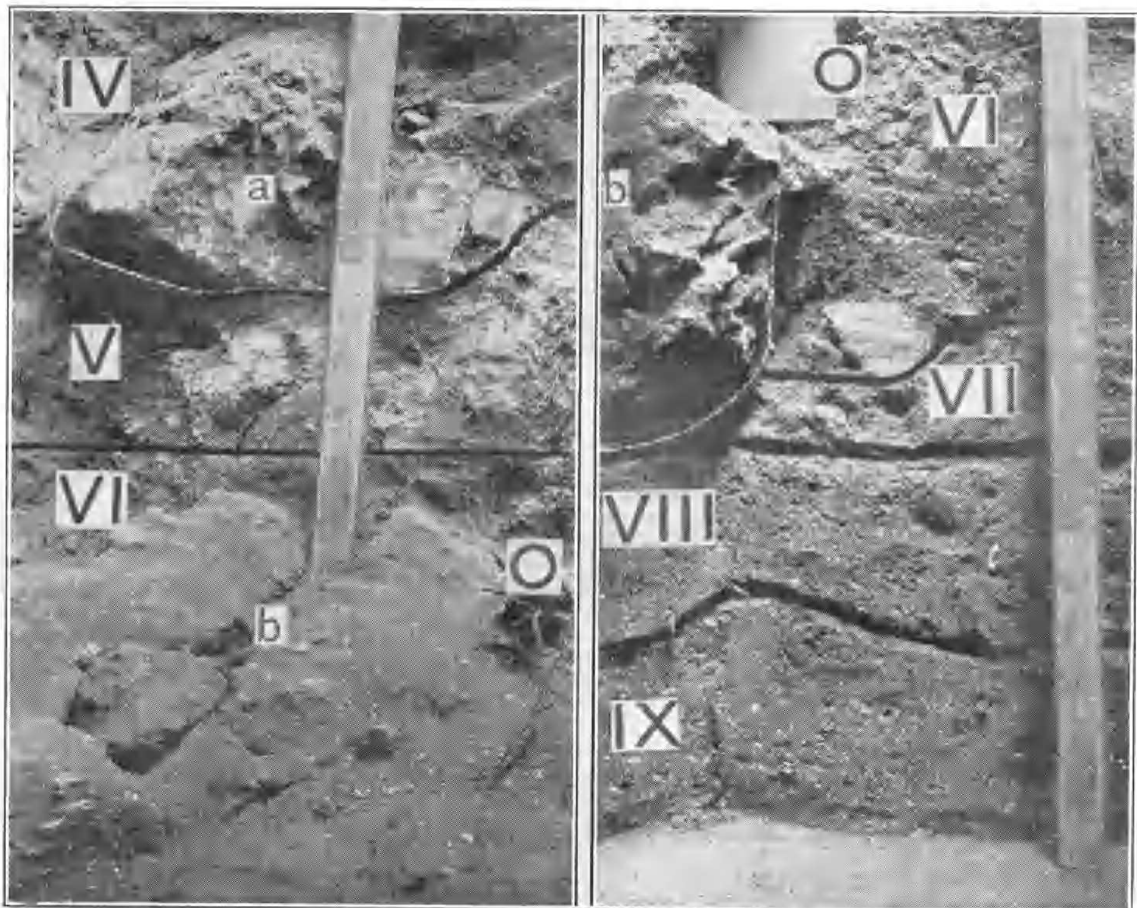


Fig. 43. South-western wall of excavation, showing parts of Layers IV-VI; a indicates unremoved portion of the rock on Layer V (see fig. 41e); b, rock fall on to Layer VI, before removal.

Fig. 44. Same wall at later period of excavation, showing remnants of rock fall b; the centimetre scale is standing on Layer IX; O indicates the same spot in this and the preceding figure.

complete human lower jaw and teeth were found at a depth of 400 cm. (fig. 41, k). These were encrusted with the limy material characteristic of layer VI, and are to be associated with a few other fragments representing an older burial which was disturbed by the excavators of the layer IV grave.

The remains of the "brown bed" infant when excavated lacked the lower left lateral incisor, four upper incisors, and the right upper canine and premolar. With the exception of the lower lateral, these teeth were subsequently recovered on the top of level VIII, where they had presumably fallen (perhaps from a pocket in the decomposed clay-like cliff limestone forming the back wall) during the breaking up and removal of a big rock (figs. 43-44, b) lying on bottom VII in the south-western corner of our excavation. It is necessary to direct attention to this apparent flaw in the excavating routine (between the 430 and 480 cm. levels), for this would have affected to a greater extent the stratigraphical evidence of layers V to VII had not the methods adopted enabled its effect to be limited to a definite, small area against the back wall.

Dentition (T. D. Campbell). Portion of a mandible with the proximal parts of the rami broken off, represents the dentition of the infant burial from the "brown level" of layer IV. All the deciduous teeth are present excepting the left lateral incisor. The half-formed crowns of the permanent molars are in their damaged crypts. With the exception of the upper right second molar all the upper deciduous teeth were found loose among the debris. These teeth are large, and present similar features as are indicated in the comments on the child from layer III (p. 216).

ARTIFACTS: Thirty-one definite implements, with well-defined retouch work; almost all occurred in the brown deposit. Twenty-eight are of chert, and three, which are cruder, are of quartz. They comprise (a) apparent attempts to form disc-scrapers or "tula" (figs. 45-48); (b) much worn *tula* (figs. 49-58), one with an edge polished by continued use (fig. 58) and one with an edge and one flat face also thus polished (fig. 59); (c) angular scrapers, with a long retouched edge (figs. 60-62); (d) nondescript or amorphous (figs. 63-65); fig. 63 illustrates a pebble with one side well worked and with secondary chipping.

In addition two hundred and thirty flakes of chert, forty-three of quartz, and one of quartzite were collected.

Exhaustive search did not bring to light any stone implements of definite type in the layers above IV.

Layer V (Mudukian). This is from 40 to 70 cm. in thickness. Its upper part is composed of a pure white consolidated limy band 25 to 30 cm. in thickness, with one thin darker horizon running through it; next is a dark brown ashy deposit 20 cm. in thickness separated, by a continuous dense *Umbro* hearth, from

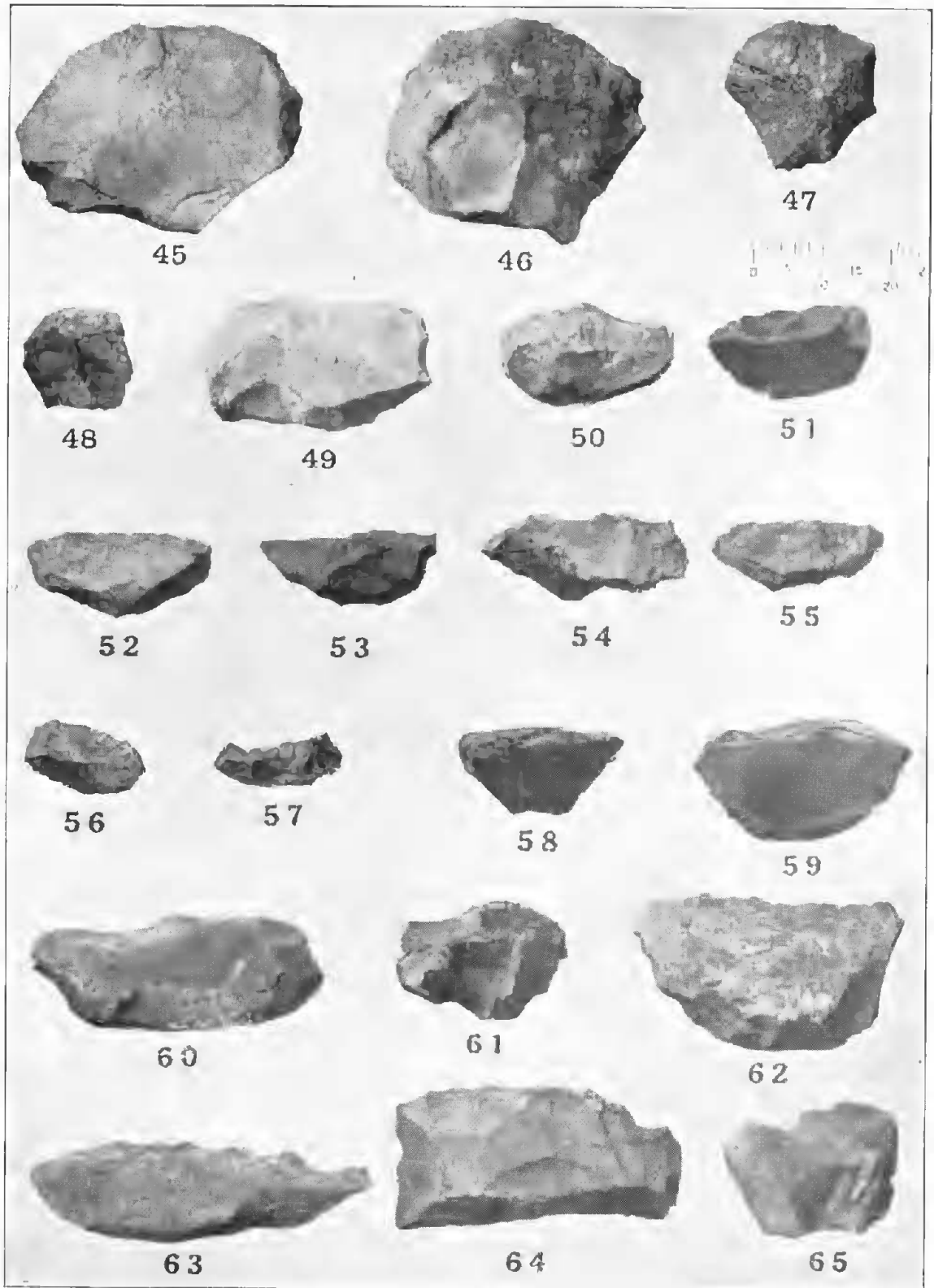


Fig. 45-65. "Murundian" stone implements from Layer IV, Devon Downs (nat. size).

an underlying white and grey limy nodular deposit, the bottom of which defines the lower limit of the layer. When cleared, the top of the upper limy bed had an irregular surface and a slope upwards to the western side of the excavation. Animal remains are relatively less abundant than in other layers, especially in the upper part, where the contained bones are all bleached white or bluish-white.

The back wall, where exposed by excavation, was found to be everywhere covered with short and, in some cases, deep grooves and scratch marks (figs. 41, m-n, and 66). These extend downwards from 300 cm. to 375 cm., thus corresponding closely with the vertical depth of the layer under discussion.



Fig. 66. Markings (of type A) on wall of shelter opposite Layer V, Devon Downs.

A cavity in the back wall, with a double entrance (at 325 cm., fig. 41, o, and also near the middle of fig. 66) contained about 10 cubic cm. of sterile grey dust and the apical portion of an obtuse pointed split bone implement (fig. 221).

MUSSELS: *Unio angasi*, *U. ambiguus*, and *Corbicula angasi*.

UNIVALVES: *Bulinus texturatus*, *Paludina hanleyi*, and *Melania balonnensis*.

CRAYFISH: *Parachacraps bicarinatus*.

FISH: *Oligorus macquariensis*.

TORTOISE: *Emydura macquarii*.

LIZARDS: *Tiliqua* and *Amphibolurus*.

BIRDS: *Dromaeus novae-hollandiae* and *Chenopsis atrata* (Black Swan).

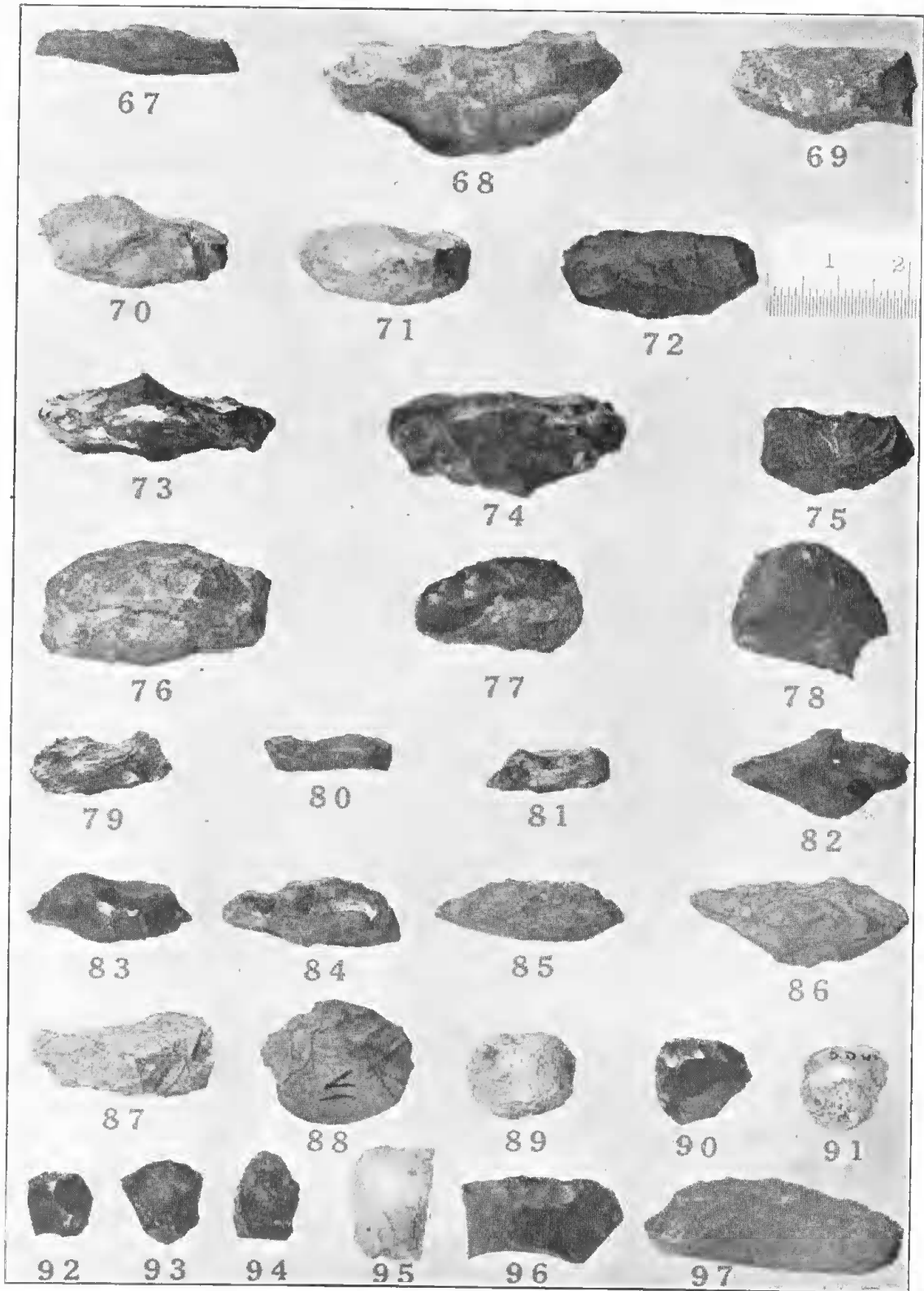


Fig. 67-97. "Mudukian" stone implements from Layers V (67-78) and VI (79-97), Devon Downs (nat. size).

MAMMALS: *Perameles* cf. *myosura*, *Lagorchestes* cf. *leporoides*, *Macropus* cf. *giganteus*, *Lasiorbis* or *Phascalomys*, and *Rattus*.

AEREFACETS: Four bone points, three of which are illustrated (figs. 98-100); three are fashioned from split bones by scraping and rubbing, while the fourth (fig. 98) is part of a pointed long bone. The bone (fig. 221) from the cavity in the back wall is similar to implements from layers VI to VII, which have not otherwise been found in layer V.

Thirteen stone implements, of yellow, red, and shiny black chert, and of dull yellow and white chert; eleven are of the worn-out *tula* type (figs. 67-76), and the other two are small discoidal scrapers (figs. 77-78).

The chippings comprise forty-four of various cherts, six of quartzite, and seventeen of milky quartz.

In addition there were six small pieces of ochre of three shades.

Layer VI (Mudukian). On the eastern half of the excavation the white and grey limy nodular deposit of V is preceded abruptly by a broad band of brownish-yellow material about 20 cm. in thickness. On the outer part of the western half, these two bands are separated by a scattered fall of rocks with a maximum thickness of 20 cm. In the south-western portion of the hole, against the wall, the top of a large rock was encountered at about 400 cm.; this rock extended downwards through the next layer, and occupied one-fourth of the area of the excavation. The upper surface of this mass, before removal, is shown in fig. 43. The brownish-yellow material merges into a dark brown deposit (20 cm. in thickness and of similar nature), which is rather well defined, above and below, by dense layers of broken *Unio* shell. The lowest stratum of VI is black and contains much burnt *Unio* debris, also bone fragments, chippings, and implements in great abundance.

It was difficult to find mussels sufficiently perfect for determination, and only one almost complete, but fragile valve of *Unio vittatus* was secured. Emu egg-shell was abundant.

MUSSELS: *Unio ambiguus*, *U. angasi*, *U. vittatus*, and *Corbicula angasi*.

UNIVALVES: *Paludina hanteyi*, *Bulinus texturatus*, and *Melania hulaensis*.

FISH: *Oligorus macquariensis*.

TORTOISES: *Emydura* cf. *macquarii* and *Chelodina* cf. *longicollis*.

LIZARDS: *Trochysaurus rugosus*, *Tiliqua*, and *Amphibolurus*.

MAMMALS: *Sarcophilus* cf. *harrissi* (Devil), *Perameles* cf. *myosura*, *Trichosurus* cf. *vulpes*, *Bellangia*, *Potorous*, *Lagorchestes* cf. *leporoides*, *Macropus* cf. *giganteus*, *Macropus*, *Thylagale*, *Lasiorbis* or *Phascalomys*, *Hydromys* cf. *chrysogaster* (Australian Water Rat), and *Rattus*.

HUMAN REMAINS: The greater of the lower jaw, some other teeth, and a few

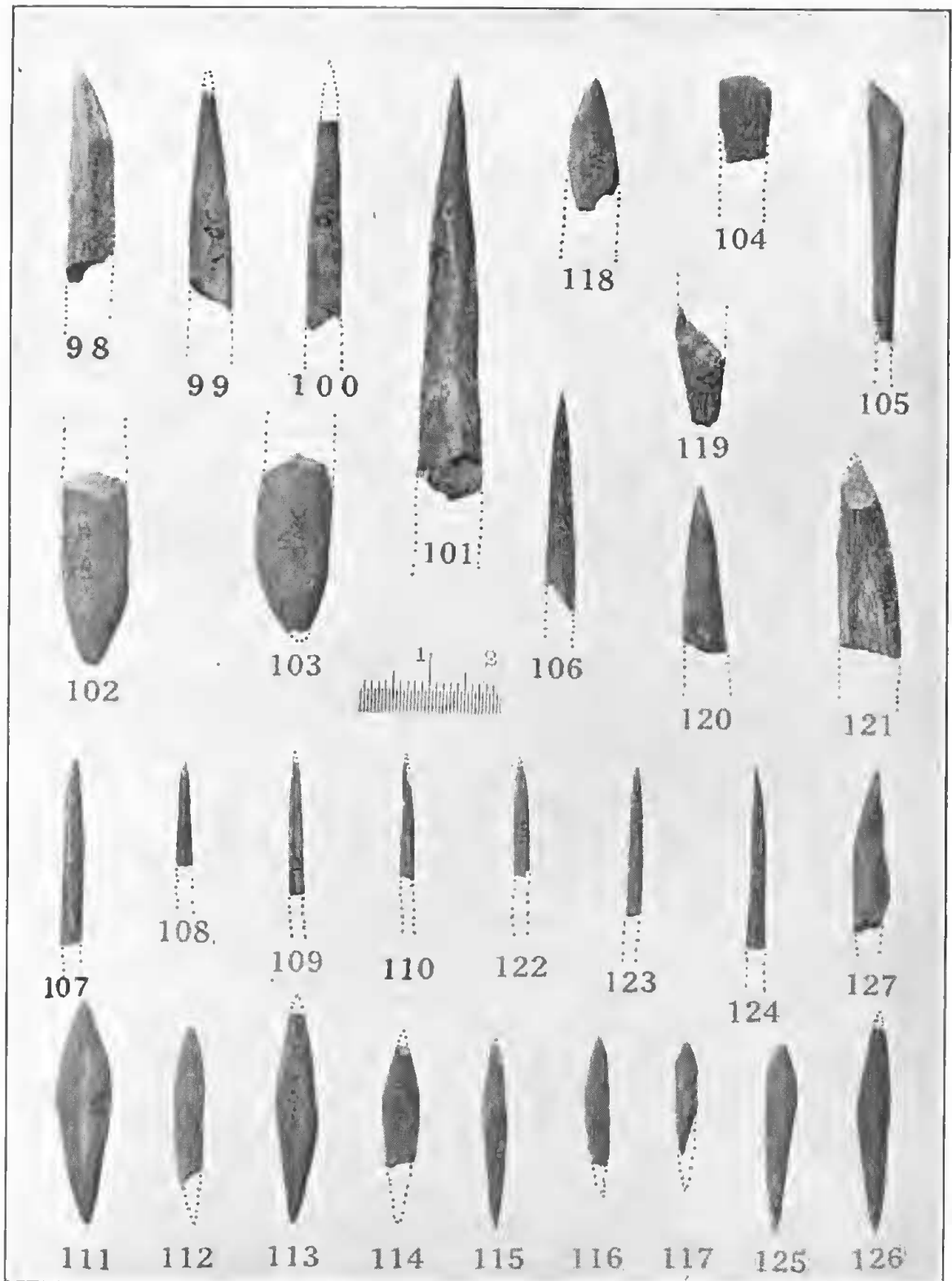


Fig. 98-127. "Mudnkian" bone implements from Layers V (98-100), VI (101-119), and VII (120-127), Devon Downs (nat. size).

fragments of the calvarium of a child of about five years of age were found (fig. 41, k and l); only two of the teeth were taken in layer VI, the rest occurring in the area disturbed during the burial of the infant from the brown level of layer IV. Owing to this intrusion it cannot be stated with certainty from what level in V or VI the older remains were first buried. The jaw when found was coated with limy deposit similar to that on bones from layer VI, so that originally it may have been buried from a surface in that layer, although there is no other reason for excluding the possibility of its interment from any level below the top of layer V.

Dentition (T. D. Campbell). The specimens consist of an incomplete mandible with the articular portion of the right ramus missing. All the teeth are present excepting the right deciduous canine. Some of the permanent teeth are still contained in their crypts. Associated with this jaw were found several upper teeth—a right deciduous first molar and a first permanent premolar with incomplete root.

The condition of the teeth suggests an age of approximately five years. The attrition is typical, and on the whole jaw and teeth shows no marked differences from other young aboriginal jaws of similar age.

ARTEFACTS: Portions of thirty-seven bone implements, nineteen of which are figured. Five types are represented, (a) a long, tapering split bone (fig. 101) and two obtusely rounded split bones, which may represent the opposite extremity of artefacts of the same sort (figs. 102-103); (b) two split bones with one end truncate or oblique and polished, possibly by use as rubbers or scrapers (figs. 104-105 and 152); (c) thirteen finely-pointed, slender, awl-like bones (figs. 106-110); (d) eight double-pointed fusiform artefacts, made from split bone, and scraped and highly polished at both ends (figs. 111-117, and 153 and 155); one example bears a mark in the form of a cross on one face (figs. 113 and 155).

The last-named (fusiform bones) are similar to the type said to have been used for fishing (see p. 205); as their name is unknown, the Murmidian word for bone, "*muduk*," is here adopted for them. A single example was found on the ledge opposite layer III.

Other fragments of bone implements include broken points (figs. 118-119) and shafts similar to that from layer V, illustrated in fig. 100.

Of twenty-four stone artefacts, nineteen are of chert and five of quartz. Twelve are worn-out *tula* or fragments of such (figs. 79-87 and 128-130), six are nondescript microliths and irregular flakes with secondary work (figs. 92-97), and six are discoidal or subdiscoidal "thumbnail" scrapers (figs. 88-91).

Chippings without retouch comprise one hundred and forty of various cherts, one hundred and twelve of quartz, and twenty-five of quartzite.

Other detritus includes a piece of resin (*Xanthorrhoea*) and seventy-five fragments of various oehres.

Layer VII (Mudukian). Consists of a layer, 10-25 cm. in thickness, of brownish deposit, containing some yellow cliff debris. It is shallowest near the wall. The big rock mass in the south-western corner (mentioned as extending upwards through VI) rests on the bottom of this layer (fig. 44, b).

Jaws of small mammals are particularly abundant; fish bones are scarce, and no crustacean remains were found. The bulk of the debris, other than *Unio* shells and ash, consists of bone fragments; relatively the occupational debris is much more abundant in this thin layer than in any of the other layers above.

MUSSELS: *Unio angasi*, *U. vittatus*, *U. ambiguus*, and *Corbicula angasi*.

UNIVALVES: *Paludina hauleyi*, *Bulinus texturatus*, and *Melania balonensis*.

FISH: *Oligorus macquariensis*, *Plectroplites ambiguus*, and *Tandanus tandanus*.

TORTOISES: *Chelodina* and *Emydura*.

REPTILES: *Tiliqua*, *Amphibolurus*, and *Trachysaurus rugosus*.

BIRDS: *Dromicus novae-hollandiae*, *Querquedula* (Teal).

MAMMALS: *Dasyurus* cf. *geoffroyi* (Black-tailed Native Cat), *Dasyurus* cf. *viverrinus* (Common Native Cat), *Perameles* cf. *myosura*, *Trichosurus*, *Beltangia*, *Lagorchestes* cf. *leporoides*, *Macropus* cf. *giganteus*, *Macropus*, and *Lasiorchinus* or *Phascotomys*.

ARTIFACTS: Portions of thirteen bone implements, of which eight are figured. The types represented are (a) two examples of the acutely pointed split bones (fig. 120); (b) two stouter examples dressed to a more obtuse point (fig. 121); (c) five examples of slender round bones tapering to a fine point (figs. 122-124); one of these was later associated with portion of its butt-end, as shown in fig. 157; (d) two of the double-pointed fusiform type (figs. 125-126 and 156); (e) a single rough bone fragment, the end polished to a point, the remainder wholly unworked (fig. 127).

One quartz-crystal and seventeen chert implements; fourteen of the latter are much-worn *tula* (figs. 135-147); another has had less use (fig. 148).

Of three crude microliths, one is a subspherical crystal "thumbnail" scraper (fig. 150) and two are flat, sub-rectangular chert scrapers (figs. 149, 151). One much-pounded quartz pebble hammer-stone was recovered.

Chippings include sixty of chert, thirty-five of quartz, and nine of quartzite. Sixteen oehre fragments, of five grades, were present.

Layer VIII (Pirrian). This layer is composed of from 30 to 40 cm. of grey homogeneous material, containing only one well-defined stratified *Unio* horizon. In our field data we note "there is a sudden change in the character

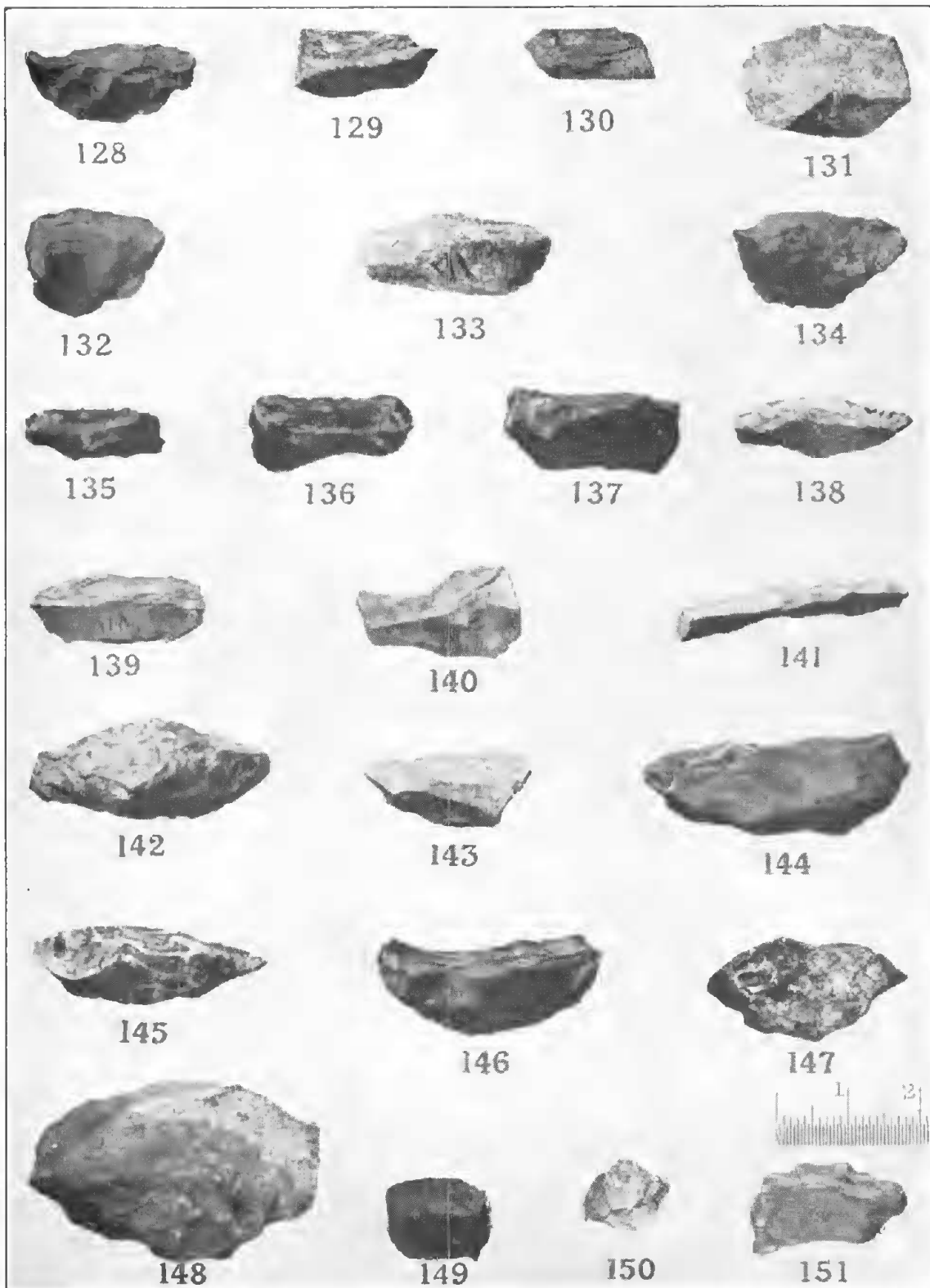


Fig. 128-151. "Mudukian" stone implements from Layers VI (128-134) and VII (135-151), Devon Downs (nat. size).

of the deposit and its contents; at first sight we were inclined to consider it comparatively sterile, but this was only because of the different type of remains. Small mammal jaws seem to be scarce, and bone fragments are commonly those of larger animals." At the conclusion of the clearing of this layer we comment "there is a greater bulk of bone fragments than in any other layer; also more broken *Unio* debris. The material is very dirty throughout, so that one does not realize the amount present in unsifted and unwashed material."

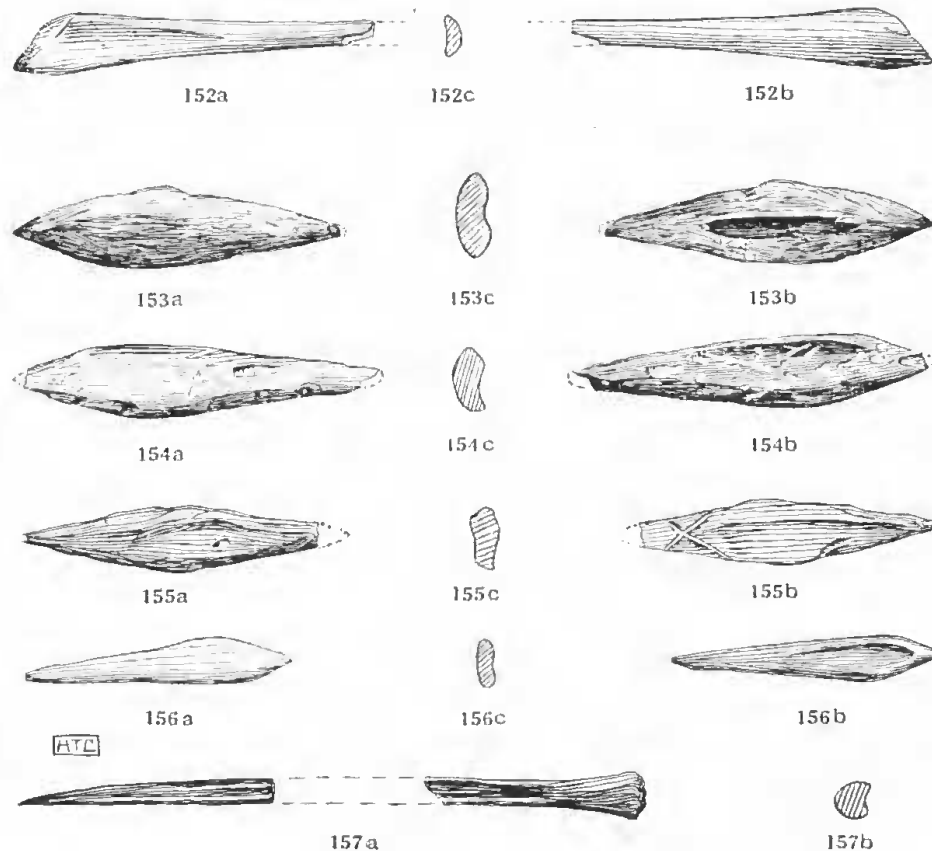


Fig. 152-157. "Mudukian" bone implements from Layers VI (152-153), VII (155-157), and the example from deposit on ledge opposite Layer III (154), Devon Downs (nat. size).

MUSSELS: *Unio ambiguus*, *U. angasi*, and *Corbicula angasi*.

UNIVALVES: *Paludina hanleyi*, *Bulinus texturatus*, and *Melania balonnensis*.

CRAYFISH: *Parachaeraps* (carpus of a cheliped).

FISH: *Oligorus* (very large vertebrae and a statolith).

TORTOISES: *Emydura* cf. *macquarii* and *Chelodina* cf. *longicollis*.

LIZARDS: *Trachysaurus rugosus* and *Amphibolurus*.

BIRDS: *Dromacus novae-hollandiae*.

MAMMALS: *Sarcophilus* cf. *harrissi*, *Perameles* cf. *myosura*, *Trichosurus* cf.

vulpecula, *Bettongia*, *Lagorchestes* cf. *leporoides*, *Macropus* cf. *giganteus*, *Macropus*, *Phascotomys* or *Lasiorchinus*, and *Rallus*.

ARTEFACTS: One complete and eighteen broken bone implements. The types represented are: (a) bluff-pointed round bones (figs. 158-161 and 174; (b) several shafts of scraped round bones; (c) two awls (figs. 162-163 and 175); (d) four points and three butts of split bone implements (figs. 164-170 and 173); (e) a broken fragment of bone with abraded or polished edges; this bears four transverse incisions near one end, and has been broken across at the first and longest of these cuts (fig. 171).

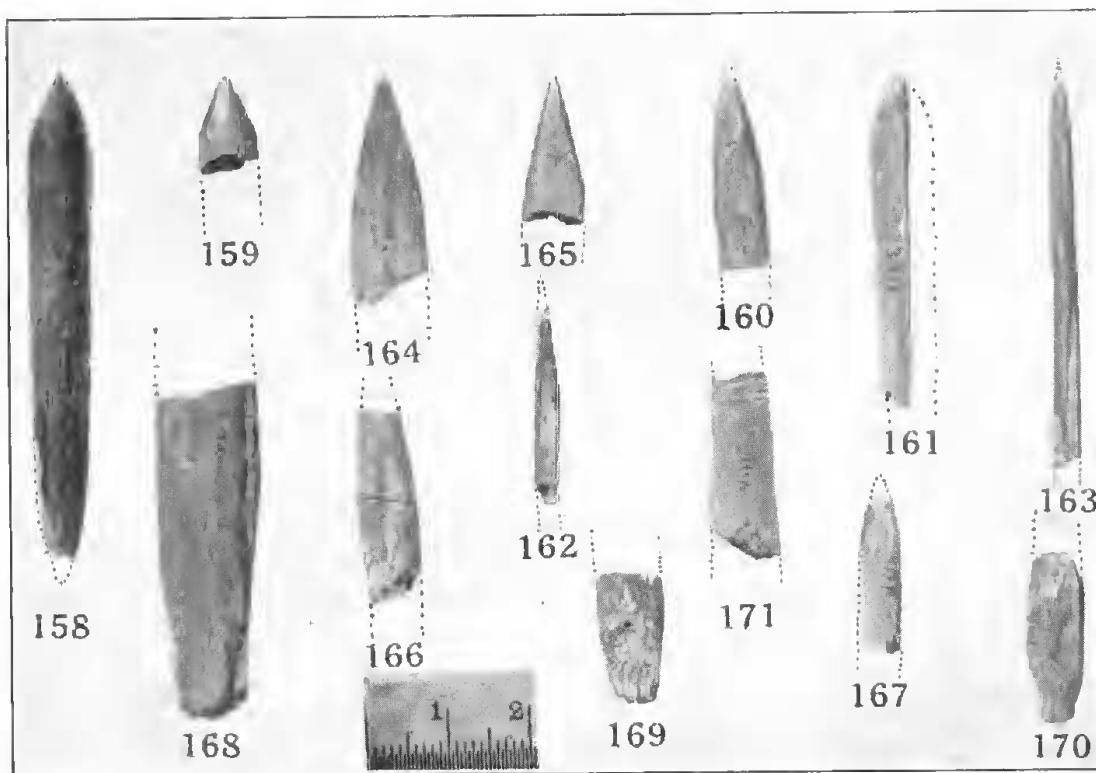


Fig. 158-171. "Pirriau" bone implements from Layer VIII, Devon Downs (nat. size).

The round-bone, bluff-pointed type, is represented by one almost perfect example and by several portions. They are made from the fibulae of wallabies. In the best preserved example the thicker end is tapered suddenly to an acute, highly polished point; the other end is slightly injured, but was also apparently pointed (fig. 174). Marks of the scraping tool employed in its manufacture are evident over practically the whole of the surface. Two fragments (one of which is shown in fig. 159) probably represent the extremities of another example of this type; the tool marks on their surfaces are similar. Fig. 161 represents a specimen which has become split longitudinally, and has then received further

scrapping and polishing on the broken face near the tip. The greater part of a large flat split bone implement, lacking only the point, bears several deep incisions (fig. 173). The posterior portion was photographed (fig. 168) before the remainder was found in the bone debris brought back to Adelaide in bulk.

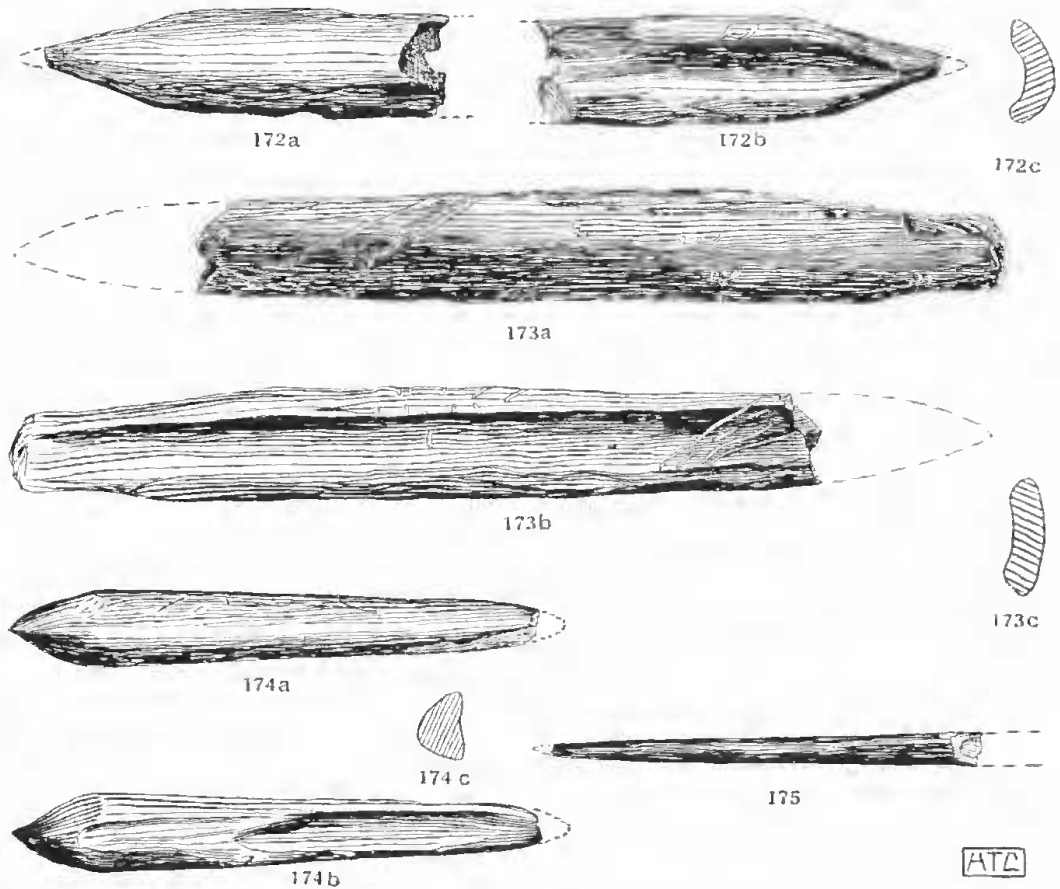


Fig. 172-175. "Pirriian" bone implements from Layer VIII, Devon Downs (nat. size).

Among the stone implements are fifteen examples of a type which is not found in any layer above; these are leaf-shaped points, fashioned from flakes of dull chert (figs. 176 and 183-189). In the manufacture it would appear that an elongate leaf-like flake, triangular or trapezoidal in cross-section, was struck off from a prepared core which had a flat striking platform. This flake was thinnest at the point of final separation from the core. Its ventral surface is usually free from marked ripples, while radiating fissures are generally confined to the point of impact; a positive bulb of percussion is often apparent. The dorso-lateral margins and posterior angles are retouched by hammer-flaking and the basal portion (striking platform) may or may not be retouched. This type of implement has been figured by Horne and Aiston (1924, pp 90-91) under the

name of “*pirric*” (*pirri*); and although their application was seemingly made in error (see p. 205) this published name is here adopted in preference to any other.

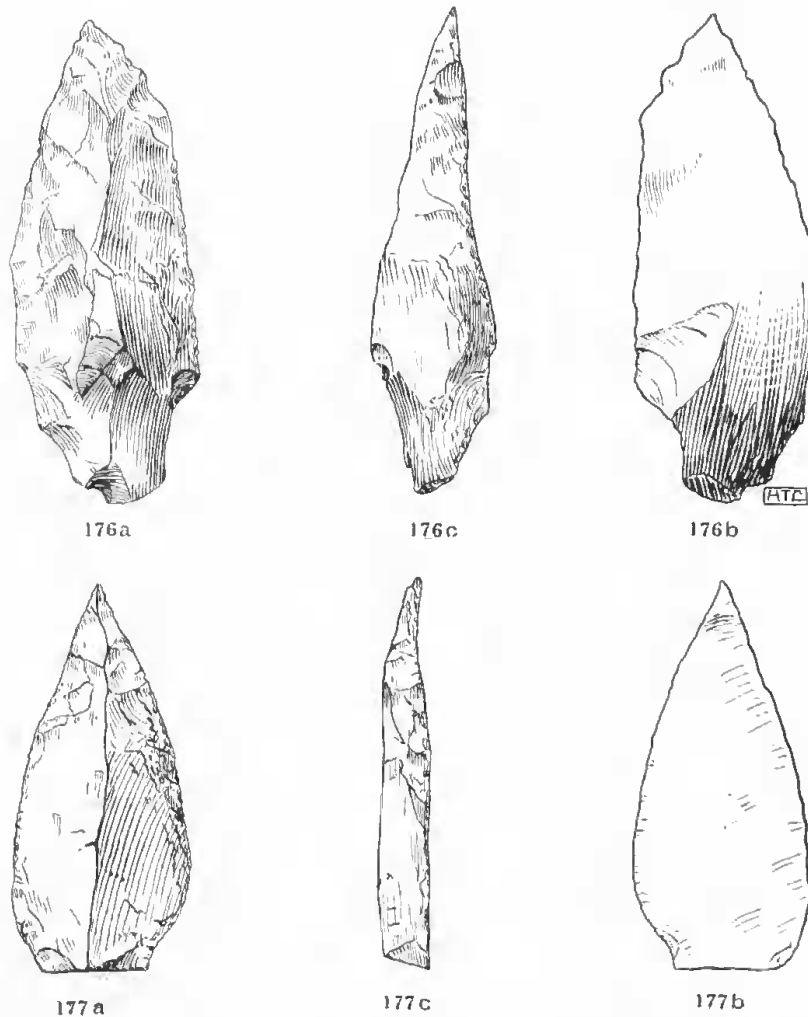


Fig. 176-177. “Pirric” stone implements from Layers VIII and IX, Devon Downs (nat. size).

Other stone artefacts include two quartz discoidal scrapers, possibly *tula* with much-worn edges (figs. 193-194); the refractory material is evidently not suitable for continued retouch. Two chert *tula* are similar to worn examples from layers above (figs. 190-191); three other implements may have been *tula*, but have been retouched in an anomalous manner (figs. 192, 195, and 197).

Six small implements do not correspond to any special type. They comprise a pointed chert flake (fig. 198) with retouched back; an elongate oval flake (fig. 196) chipped all round, an irregular concave scraper with two notches (fig. 199), an oval fragment retouched on both faces (fig. 202), and two irregular or broken chips with secondary work on one margin only (figs. 200-201).

Chippings include ninety of various cherts, mostly of a dull white appearance, thirty-four of milky quartz, and six of quartzite. Only two small fragments of red ochre were recovered.

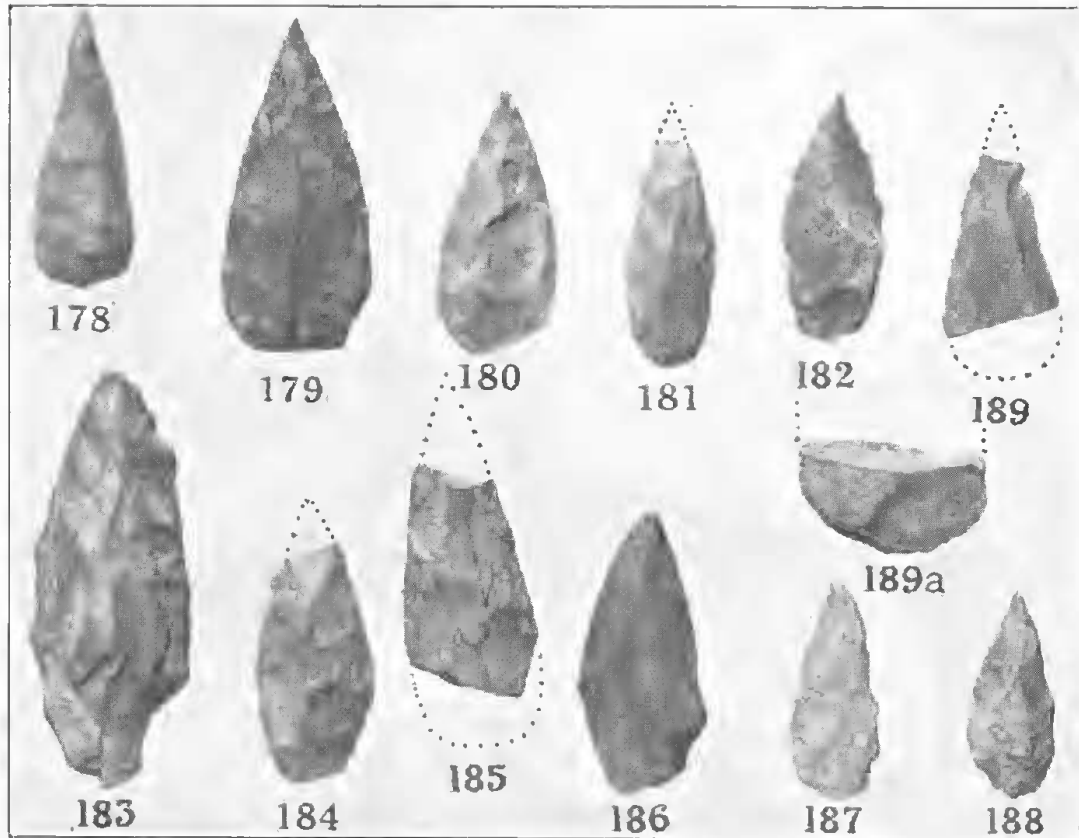


Fig. 178-189. "Pirrian" stone implements from Layers VIII (183-189) and IX (178-182), Devon Downs (nat. size).

Layer IX (Pirrian). Consists of a nearly horizontal layer 30 to 35 cm. in thickness, of greyish-brown material, showing few signs of lamination. The ratio of debris to ash is high. Bone fragments, usually of large animals, are numerous, but jaws are scarce. *Unio angasi* is abundant; many of the shells are large, all are fragile, and only a few could be saved for measurement. One example, 41 cm. in width, was exceptionally thick shelled (6.9 mm.). *Sarcophylus* is here represented by portion of a mandible and some other bones.

MUSSELS: *Unio angasi*, *U. ambiguus*, *U. vittatus* (a single example), and *Corbicula angasi*.

UNIVALVES: *Paludina hanleyi*, *Bulinus texturatus*, *Melania balonnensis*, and *Xanthomelon* cf. *cyrci* (two examples).

FISH: *Oligorus* (very large vertebrae).

TORTOISES: *Chelodina* cf. *longicollis* and *Emydura*.

LIZARDS: *Amphibolurus* and *Trachysaurus*.

BIRD: *Dromacus novae-hollandiae*.

MAMMALS: *Sarcophilus* cf. *harrissi* (fig. 214), *Perameles* cf. *myosura*, *Bellongia*, *Lagorchestes* cf. *leporoides*, *Thylogale*, *Macropus*, *Lasiorhinus* or *Phascolumys*, and *Rattus*.

ARTIFACTS: Portions of eleven bone implements: (a) parts of three "round-bone" points (figs. 203-204, 212, and 223); (b) the rounded butt of a long artefact with the usual indications of scraping (fig. 205 and 222); this is possibly made from a bone of *Sarcophilus* cf. *harrissi*, as portion of a jaw of this animal from the same horizon exhibits the same peculiar graining and staining (fig.

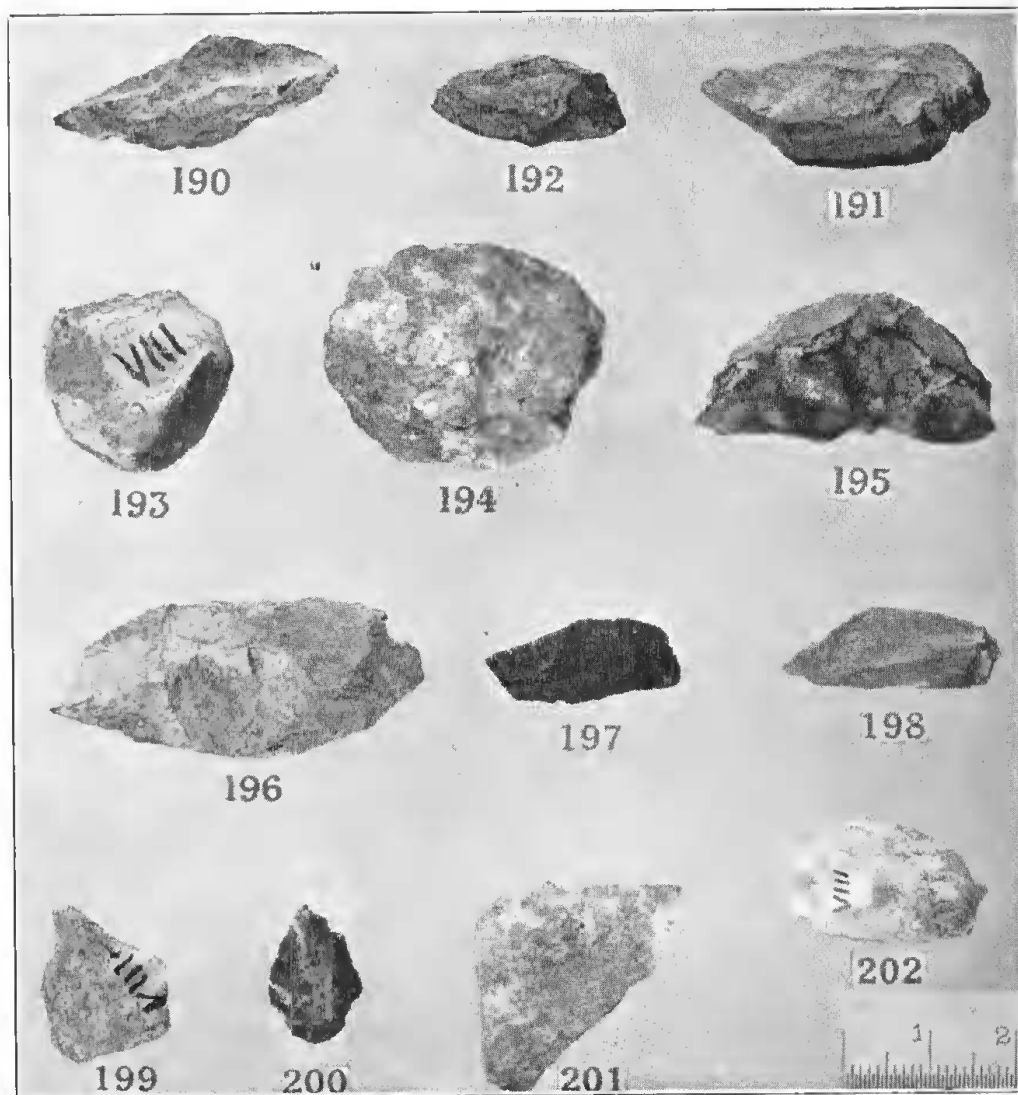


Fig. 190-202. "Pirriian" stone implements from Layer VIII, Devon Downs (nat. size).

214); (c) six split-bone points (figs. 206-211 and 225-226); (d) a small irregular bone chip, partly scraped and polished to a point (fig. 213); (e) a rough bone with numerous fine incisions on one face, and coarse cuts on one margin; this is perhaps a bone marked by the teeth of an animal, but it resembles the bone implement used as a compressor among some natives who practise pressure flaking (fig. 224).

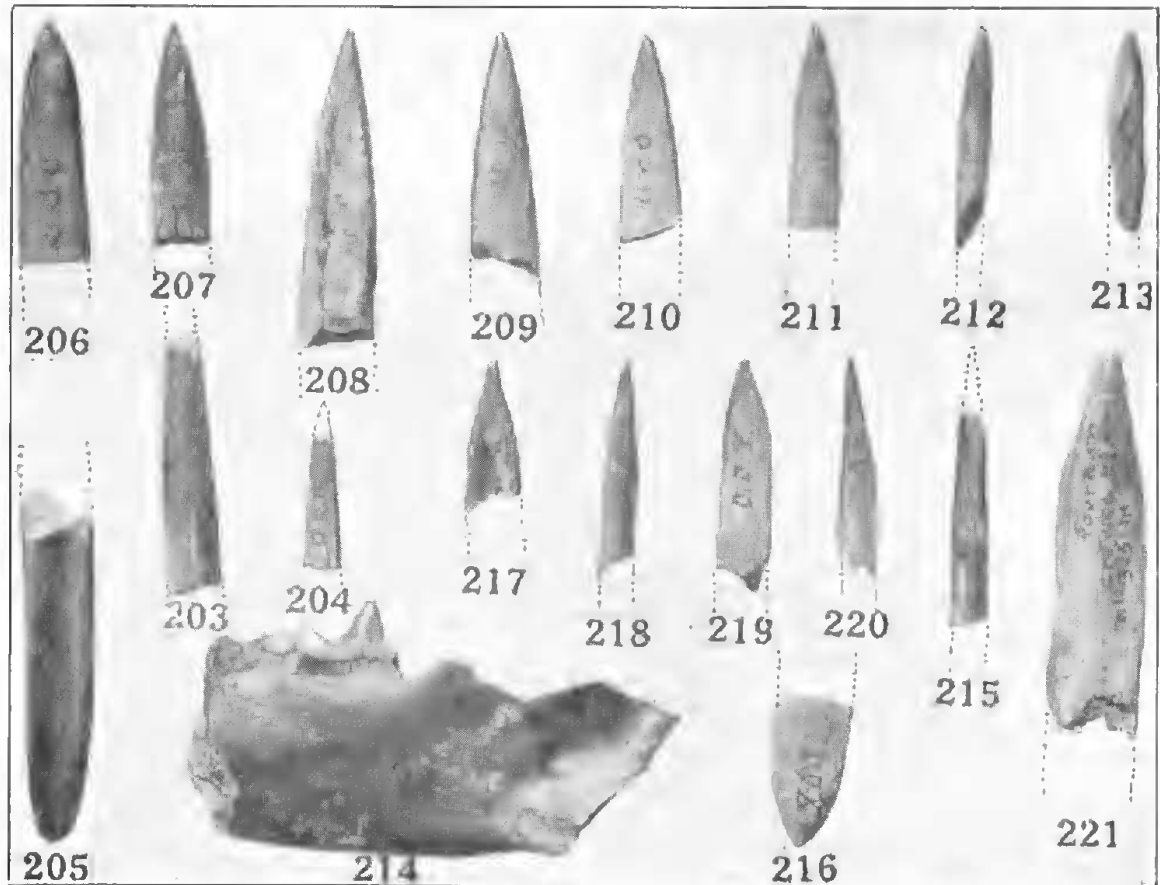


Fig. 203-221. "Pirrian" bone implements and portion of right ramus of jaw of *Sarcophilus cf. harrissi*, Layer IX (203-214) and Layer X (215-221), Devon Downs (nat. size).

Stone artefacts include nine *pirri* of white or grey chert (figs. 177, 179-182, and 240-241) and two of quartz (fig. 178); also one large crescentric implement (fig. 229) of dull grey chert, with a finely flaked convex margin. One elongate pebble hammer-stone of quartzite, only 4 cm. in length, with battered ends and sides, has a well-marked depression on one face.

Indefinite chippings include sixty-one of chert, almost all either white or grey, twelve of quartz and one core of white chert from which *pirri* may have been struck. No oebre was apparent, but a piece of pipe-clay was secured.

Layer X (Pirrian). The presence of a thin darker band and a slight change of colour of material assists in separating layers IX and X. Layer X is 20 to 25 cm. in thickness, and is largely composed of consolidated yellowish-grey material which breaks in large coherent lumps. Although this layer is only 1.7 metres above low river level it was dry. Much of the debris near the wall consists of sterile decomposed cliff, a shelf of which juts out and at the bottom of the level occupies the inner half of our excavation. This ledge is much reddened by fire, and in places the rock is thus affected for from 10 to 15 cm. from its face. Many burnt hearth-stones of cliff material were present. The animal debris is similar to that of the layer above. Several lenticular *Unio* hearths were present. In this and the lower layers charcoal is abundantly preserved.

MUSSELS: *Unio angasi*, *U. vittatus*, and *Corbicula angasi*.

UNIVALVES: *Bulinus texturatus*, *Paludina hantegi*, and *Helix*.

FISHES: *Oligorus macquariensis* and *Tandanus tandanus*.

TORTOISE: *Chelodina* cf. *expansa*.

BIRDS: *Dromacus novae-hollandiae*, and Ducks (spp. unknown).

MAMMALS: *Isodon*, *Trichosurus*, *Bellongia*, *Lagorchestes* cf. *leporoides*, *Thylagale*, *Macropus* cf. *giganteus*, *Macropus*, *Hydromys* cf. *chrysoaster*, and *Rattus*.

The turtle bones from this layer, although fragmentary, exhibit differences from those of the turtles now living in the Lower River Murray. They were therefore referred to Mr. Heber A. Longman (Director of the Queensland Museum), who kindly examined them. He writes: "It seems to me that the fragments agree best with *Chelodina expansa*, especially in the extension of the border of the ischium to near the emargination of the plastron. The proximal moiety of the right humerus agrees fairly well in its contours with that of a medium-sized specimen of *Chelodina expansa*. It is unfortunate that the complete sutures of the intergular shield are not present."

ARTIFACTS: Parts of nine bone implements include: (a) portions of three round bones (fig. 215); (b) the bluff-pointed tip of a split bone implement (fig. 216); (c) five split bone points (figs. 217-220), three of which apparently have been formed from nutrimmed splinters, and only the point bears indications of scraping or polishing (figs. 219-220).

Stone artefacts include ten chert *pirri* (figs. 230-239); two small chert scrapers, one irregular and the other crescentic; one large, irregular, rectangular, white chert scraper, with one concave worked edge; two microliths (a quartz disc and an irregular chert), and part of a quartzite hammer-stone.

Chippings comprise forty-five of chert, mostly dull yellow or grey, and four of quartz. Two pieces of pipe-clay were found, but no red oebre.

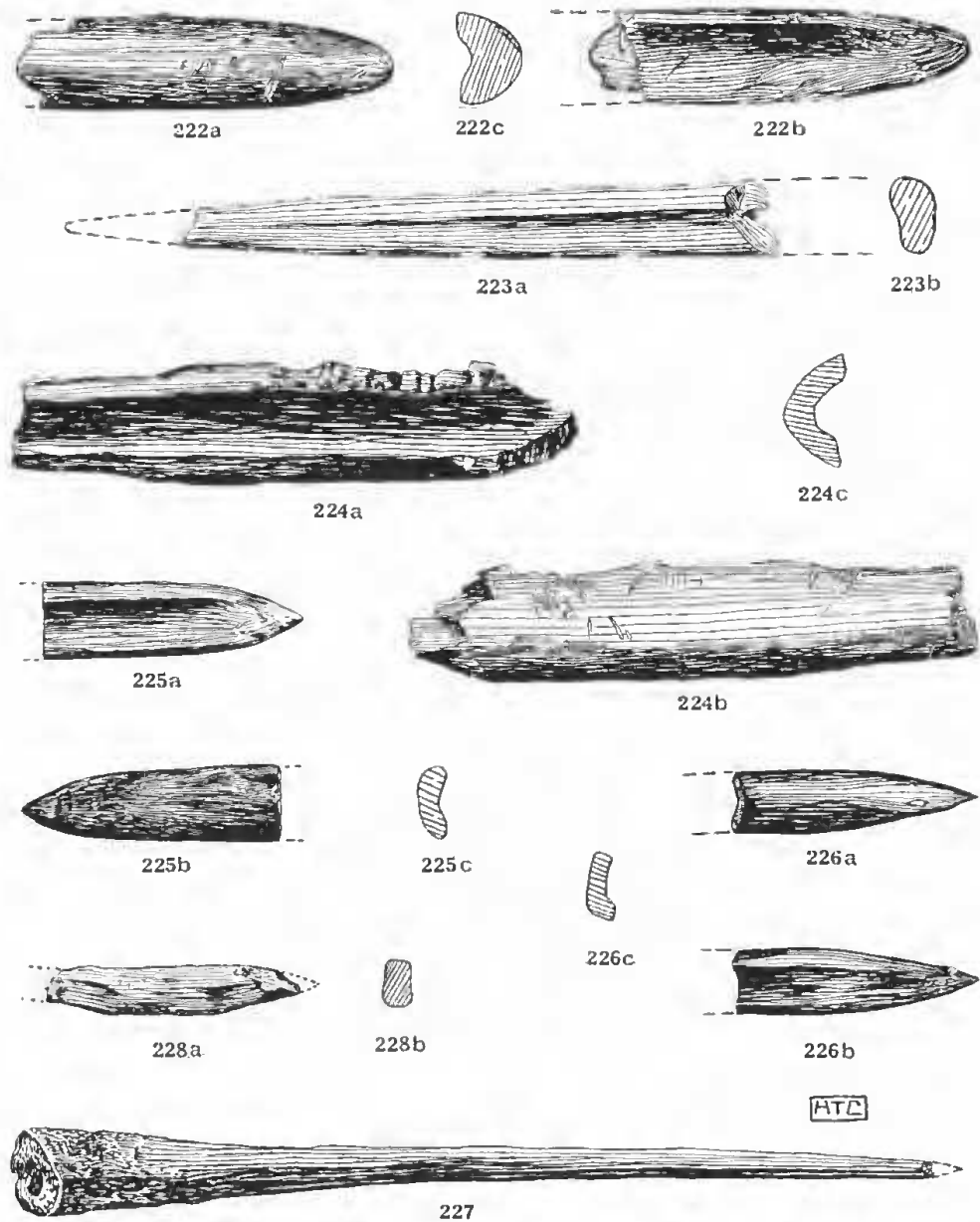


Fig. 222-228. "Pirrian" bone implements from Layer IX (222-226) and "Pre-Pirrian" examples from Layer XI (227-228), Devon Downs (nat. size).

Layer XI (Pre-Pirrian). Consists of a nearly horizontal layer, 30 cm. in thickness, which occupied only the northern half of the area of the excavation owing to the outward slope of the cliff here forming the floor of the shelter; thus the bulk of the material examined is much smaller than in other layers. The deposit is yellowish, somewhat earthy, consolidated, and dry, and contains much gritty cliff material.

Unio shell is relatively scarcer than in layer X; burnt pieces of cliff limestone and burnt limy concretions are more plentiful than in any other layer.

MUSSELS: *Unio* (many fragments, not determinable) and *Corbicula angasi*.

UNIVALVES: *Bulinus texturatus*, *Paludina hanleyi*, *Melania balonnensis*, and *Xanthomelon cf. cyrei*.

FISH: *Oligorus*.

TORTOISE: Not identifiable.

MAMMALS: *Trichosurus cf. vulpecula*, *Bellongia*, *Lagorchestes cf. leporoides*, *Macropus cf. giganteus*, and *Macropus*.

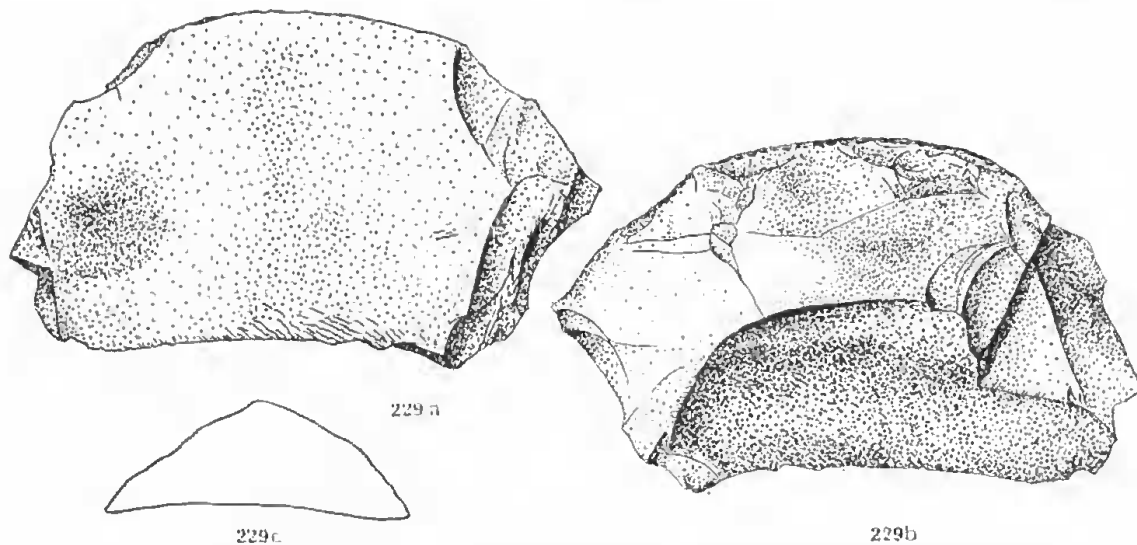


Fig. 229. "Pirrian" stone implement from Layer IX, Devon Downs (nat. size).

HUMAN REMAINS: A single very worn deciduous tooth; the crown portion of an upper left deciduous incisor. The crown has been large, but is considerably worn by attrition. The root has apparently been absorbed away, and only two or three millimetres of it remain.

ARTIFACTS: Bone implements are represented by an almost perfect example of an acute-pointed round bone (fig. 227) and by an irregular piece of split bone showing polishing marks (fig. 228).

No stone implements were present. A nondescript piece of chert exhibits doubtful retouch. Thirty-one chert chippings, and two of quartz were encountered, together with one piece of pipe-clay and two of red ochre.

Layer XII (Pre-Pirrian). Consists of a pocket of debris, of a maximum thickness of 55 cm., which occupied the outer third of the excavation and extended everywhere to the rock bottom. The material is earthy and dark in colour, and contains burnt stones, sparse *Unio* shell, and much charcoal. Rock boulders, many showing the effects of fire, were abundant. *Unio* and other

occupational detritus were found adhering to the floor of the shelter and in crevices in the rocky floor.

The bulk of deposit examined was relatively small; it is poor in occupational debris in comparison with the layers immediately above; it may be mentioned, however, that the portion of the floor of the shelter exposed by the excavation was rugged and uninviting as camping ground. If further excavations are undertaken it would be well to devote some time to the examination of this layer at a point further away from the wall; the general downward trend of the floor of the shelter is rapid, but that of the surface of the layer is gradual, indicating that a considerable outward extension of it may be expected.

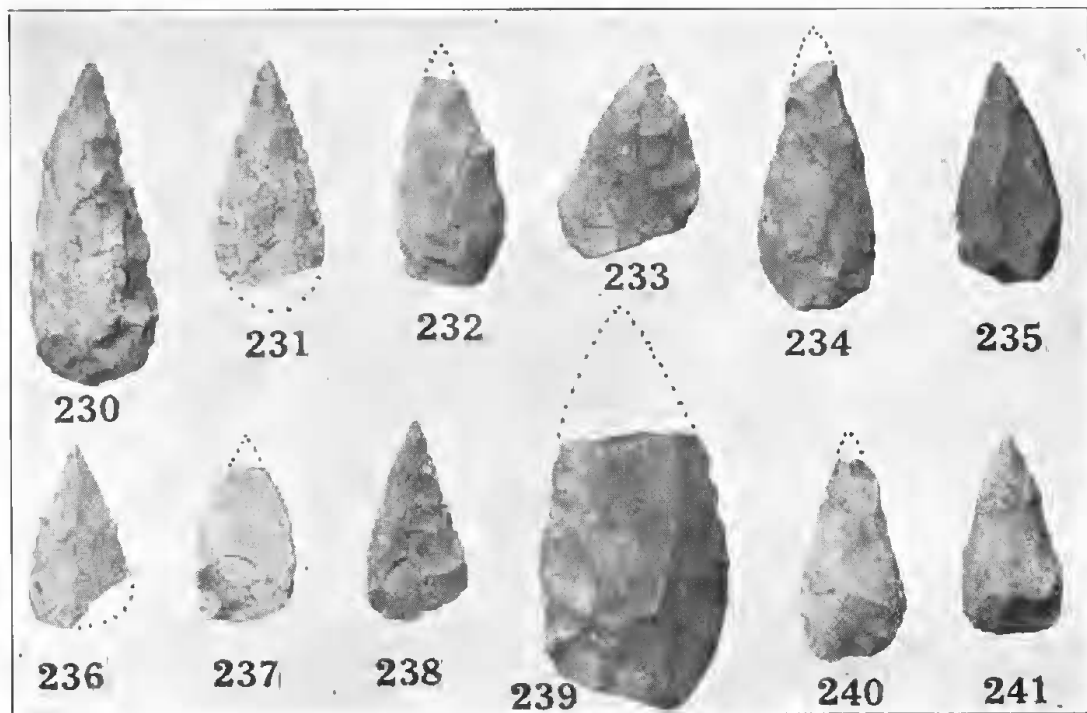


Fig. 230-241. "Pirrian" stone implements from Layers IX (240-241) and X (230-239), Devon Downs (nat. size).

MUSSELS: *Unio ungas*, *U. vittatus*, and *Corbicula ungas*.

UNIVALVES: *Bulinus texturatus*, *Paludina hantleyi*, and *Xanthomelon cf. eyrei*.

FISH: *Oligorus*.

TORTOISE: Unidentifiable fragments.

BIRDS: *Dromacus novae-hollandiae* (vertebrae); unidentifiable bones of other birds.

MAMMALS: *Sarcophilus* (or ? *Canis*) (fragment of two-rooted tooth only), *Trichosurus* cf. *vulpecula*, *Hydromys* cf. *chrysogaster*, and *Rattus*.

ARTEFACTS: No implements, either of bone or of stone, were recovered.

Chippings included ten of chert and one of quartz. There was also a single piece of pipe-clay.

IV. DISCUSSION.

The transportation of stone by the natives is evident at both Tartanga and Devon Downs, because, with the exception of white and greyish cherts and the fossiliferous marine limestone and travertine, all of the stones are foreign to the localities. The nearest outcrops of Pre-Cambrian rocks are on the Rhine Creek, about four kilometres south-west. At Tartanga itself the fossiliferous limestone of the cliff is not found except when it has been transported there and utilized as hearth or oven stones, as evidenced by the burnt fragments occurring in strata B to E.

Cherts, phyllites, micaceous schist, quartzite, quartz, lamprophyre, and igneous rocks occur as burnt or broken fragments, hammer-stones or implements, at Tartanga; similar series have been found in the Devon Downs shelter.

SEQUENCE OF CULTURAL PHASES AT TARTANGA AND DEVON DOWNS.

A study of the results of the excavations at Tartanga and Devon Downs seems to show the presence of a sequence of cultures here termed (in ascending order) Tartangan, Pre-Pirrian, Pirrian, Mudukian, and Murundian, the first-named being separated from the others by a time lapse of unknown duration. The terms "Mudukian" and "Pirrian" are derived from the names of the typical implements represented, and the word "Murundian" from the local sub-tribal name of the latest occupants of the district.

Although the *muduk* was not found in the sparse occupational bands of layer V, the facies of the material recovered is similar to that from layers VI and VII (which contain the *muduk*) rather than to that from layers above it; it is therefore arbitrarily termed Mudukian herein. Layer V, and the brown horizon in layer IV may perhaps be regarded as transitional to the Murundian series.

This sequence of culture-phases from the Tartangan upward is conveniently shown in the following table:

CULTURE-PHASES.	SITE.	SALIENT FAUNA.	INDUSTRIES.
Tartangan	Tartanga beds A-E	<i>Unio protovittatus</i>	Stone and bone industry. Large patinated discoidal scrapers, coarsely retouched; coarse bone implements.
Pre-pirrian	Devon Downs XI-XII	<i>Bulinus</i> much more abundant than <i>Melania</i> . <i>Unio vittatus</i>	Scant bone industry; stone chippings, but no implements recovered. [Not well known.]
Pirrian	Devon Downs VIII to X	Large mammals common. <i>Sarcophilus cf. harrissi</i> . <i>Chelodina cf. expansa</i> . <i>Unio vittatus</i>	Rich stone and bone industry. <i>Tula</i> rare in upper and absent from lower layers. Leaf points (<i>pirri</i>) abundant; double-pointed bones (<i>muduk</i>) absent.
Mudukian	Devon Downs layers V to VII	Small mammals numerous. <i>Sarcophilus cf. harrissi</i> . <i>Unio vittatus</i>	Rich stone and bone industries including <i>tula</i> and double-pointed bones (<i>muduk</i>). Rock markings, Type A.
Early Murundian	Devon Downs layers II to IV	All are existing species of animals. <i>Unio vittatus</i>	Degenerating stone industries; adze stones (<i>tula</i>) common only at beginning; bone artefacts very rare. Rock markings, Type B.
Late Murundian	Devon Downs layer I	All are existing species. <i>Unio vittatus</i> . <i>Melania</i> much more abundant than <i>Bulinus</i>	Degenerate stone culture. Rock markings, Type C.

It is difficult at present to define the relationship between the Tartangan material and that occurring in the cliff shelter, but, as already stated, there is a time-lapse, of unknown duration, between them. The Tartangan culture is more primitive than the Pirrian and succeeding cultures.

The "leaf-point" stone artefacts characteristic of layers VIII to X (figs. 176-189 and 230-241), and for which the name *pirri* is herein adopted, have long been known from old camp-sites in many parts of southern Australia, but their use amongst living tribes has not been observed. Horne and Aiston (1924, pp. 90-91, etc., and fig. 67) illustrate examples of this implement under the Woukanguru name "*pirrie*," regarding it as the forerunner of a simpler flake in use to-day; this less developed flake is fastened to a stick with gum and used as a drill (see also Brough Smyth, 1878, p. 380, fig. 200). Horne and Aiston write: "It is used as a graving tool . . . and occasionally . . . as a drill for light boring work. . . . The art of making these seems to be lost among the tribes here, though one old man showed me how they were made by pressure. I have found hundreds that were beautifully chipped . . . but those used by the blacks to-day are simply any sharp-pointed stone."

Thus it is evident that the elongate triangular implement with retonched edges and prepared butt is unknown among living Woukanguru natives. It seems possible that this artefact may have been a spear-head; certainly it is typologically distinct from the modern flake-drill, and seems to have been fashioned entirely by hammer flaking, not by pressure. Nevertheless, it seems convenient to adopt the name applied by Horne and Aiston to the "leaf-flake" in order to avoid further confusion, and to regard the examples figured by them as typical.

The implements recovered seem to indicate that the people of Mudukian horizons were the last at Devon Downs to extensively utilize bone implements; most of the examples are smaller than those common in Pirrian and earlier layers. The "*muduk*," or supposed fishing-bone, the most characteristic of these bone artefacts, apparently was not used by Murundian people; it has been found in Victoria, on sand-hummocks between Tower Hill and Port Fairy, and has been indirectly recorded by Brough Smyth (1878) from Geelong as having been used by natives within recent times. In the accompanying drawing (fig. 242) a line is shown attached to one of the *muduk* from Devon Downs in the manner illustrated by Brough Smyth; it is worthy of note that slight grooves are present on the edges of the bone where encircled by the string (compare figs. 111, 153, and 242, all illustrations of the same specimen).

Local native legends indicate that within tribal memory there has been a southward movement of peoples from up river; it would seem that, if this movement is linked with Murundian levels, the latest cultural phase has not extended to the coastal parts of eastern Victoria, where people of a somewhat earlier phase (possibly comparable with the Mudukian) existed until the present time. Additional evidence is necessary, however, before this theory can be defi-

nately advanced, but the occurrence would perhaps be similar to the known replacement and absorption of the very primitive Wirrangu people of the West Coast of South Australia by the somewhat more advanced inland Kukata natives from the north, a movement which is still in progress.

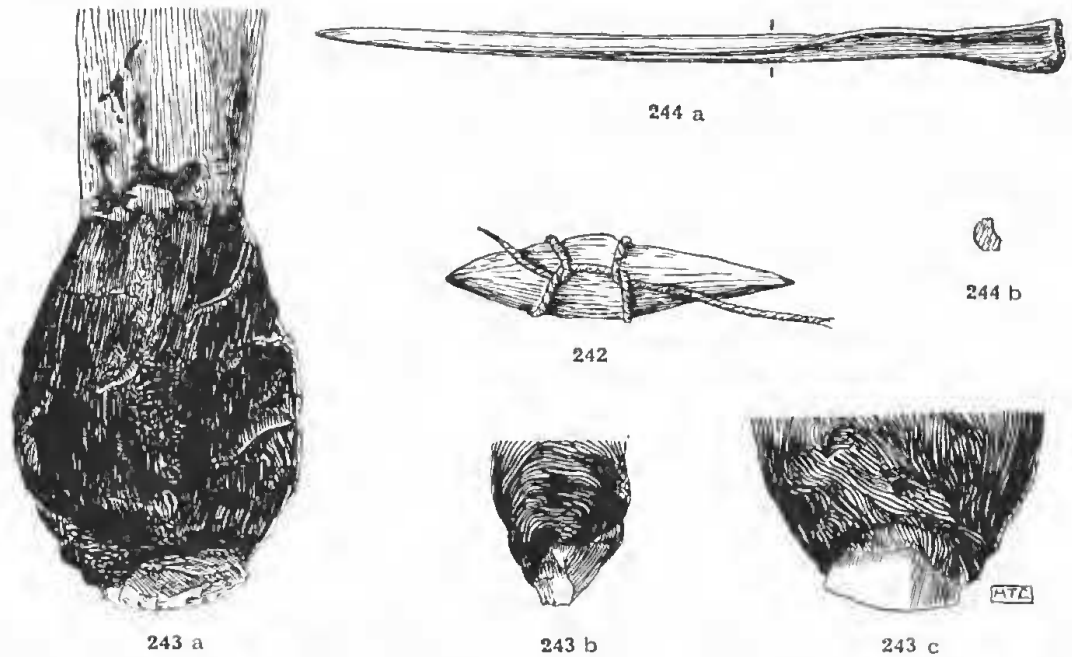


Fig. 242. "Fishing bone" showing line attached after the manner indicated by Brough Smyth.

Fig. 243. Extremity of adze showing method of mounting in gum, and wearing of stone "tula" (Gascoyne District, W. Aust., S.A.M., No. A 4283).

Fig. 244. Bone awl from Frew River, Central Australia, Arunta Tribe, S.A.M., No. A 11733 (nat. size).

The Murundian may be conveniently divided into an earlier and later phase. The latter is probably that of the aborigines who, until the advent of the white man, occupied the country from Rhine Creek northward to North-west Bend; the Devon Downs shelter is still occasionally used by the lingering remnants of the tribe. The principal objects of their culture, at the time of their first contact with Europeans, included the following: Polished basalt axes (*purra-turi*), almost certainly traded from western Victoria and the south-east of South Australia (fig. 245); adzes (*marrapung*), formed by fixing with gum a discoidal flint to the end of a stick 20 to 30 cm. in length. Wooden weapons comprised light spears (*kaiyur*) of tea-tree (*Leptospermum*) and reed (*Phragmites communis*), which were thrown with a spear-thrower (*ngewangko*); small spears called *kaieko*, and heavy javelins; waddies (*purra*), fighting sticks (*nakko*), and long, double-edged, heavy sticks (*tadnannakko*), and shields, both plain (*tur-*

ramo) and ornamented (*tayarukko*). Climbing-sticks (*kailko*) were used for ascending red gum trees (*Eucalyptus rostrata*), by driving them into the thick bark; they were also utilized, with or without stone axes, for cutting out elongate sheets of gum bark, from which canoes were made; the larger canoes were called *yungguilp*, smaller ones *manno*. Bags and baskets included the *puwatto*, or rush-basket, netted bags (*dleuko* and *rakko*), food-bags (*uningka*), and bark dishes (*yepille*).



Fig. 245. Basalt axe head, Claypans, River Murray, S.A.M. No. A 14592 (nat. size).

Fish were caught in nets (*ratto*), and ducks by other nets (*nouqkun*) suspended between trees near the ends of lagoons. Spinning-sticks (*bakku* and *wirritpi*) were used in the manufacture of strings for nets and for articles of dress such as hair girdles (*kerreran*). Fur-skin cloaks (*tianko*) were worn; stuffed skins were used as beating pads (*tapparingi*) during dancing. Nose-pegs (*romman*) of bone and wood were made, and bone awls (*puungutta*) fashioned from parts of tibiae of kangaroos and emus were utilized for the sewing of skins.

The adze (*marrupung*) mentioned above is recorded for the Murundi tribe on the authority of one observer (Moorhouse, 1846, p. 37). It seems probable

that the implements referred to herein as "*tula*" were "adze-stones" primarily mounted in gum in the well-known manner (fig. 243), but that when considerably reduced in size by continued retouch after wear they were used in the fingers as crescentic or "high-backed" scrapers. Evidence of continued use after reduction is perhaps furnished by examples with partly polished edges and face found in layer IV of the Devon Downs shelter (figs. 58-59). *Tula*, worn or otherwise, are but seldom found on camp-sites in the Murray Valley known to be of recent origin, and from the evidence of the shelter it is suggested that they had become almost obsolete before the advent of the first Europeans.

A half-caste native, 80 years of age, recently informed us that the "*marrupung*" was a polished stone axe, and that his people (on the lower River Murray) did not use adze-stones mounted on a stick.

Mr. F. Preiss, the owner of the land on which Tartanga is situated, states that after the big flood in 1917 he found a human skeleton exposed on the river bank in the Upper Beds dealt with in this paper. It was buried in a flexed position, with the head to the west, and associated with it was a black stone polished axe-head, now in the possession of Mr. F. A. C. Bleeser.

The detritus left by the late Murundians in the top layer of the Devon Downs shelter furnishes only a limited view of their culture. For example, no wooden objects have survived even in this layer; a stick driven into the damp outer zone of the shelter debris by the authors became riddled by termites within six months, so it is evident that wooden implements would be speedily destroyed.

ROCK MARKINGS.

Apart from ornamentation on weapons, utensils, and the body, the only signs of art, and the only evidence which would survive, are furnished by rock-carvings and paintings; the last-named are at present known within the Murundian tribal area from Haylands, twelve kilometres to the north of Blanchetown (Sheard, 1928), but carvings have been found at Wongulla, Froum's Landing, Swan Reach, etc. (Hale and Tindale, 1925, and Sheard, 1927 and 1928).

Scores of these carvings occur on the walls and roof of Devon Downs shelter. From time to time large sections of the roof and walls, bearing carvings, have fallen on to various layers in the rock shelter, thus exposing new surfaces for ornamentation.

The character and position of these markings suggest that they may be divided into three groups, namely:

- Type A, characteristic of layers V to VI, or earlier.
- Type B, characteristic of layers II to IV.
- Type C, characteristic of Layer I.

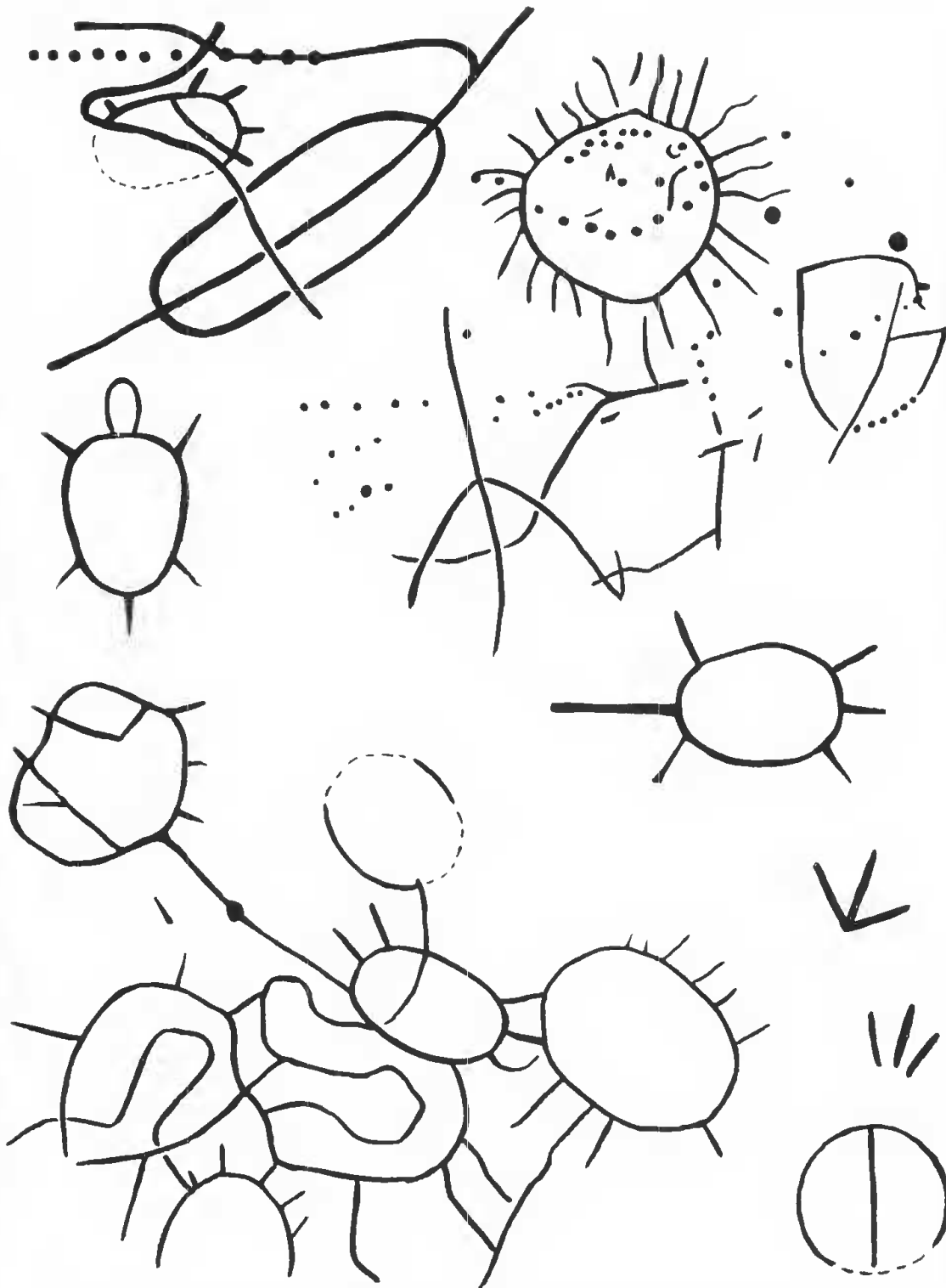


Fig. 246. Rock carvings (type B) from roof of shelter, Devon Downs.

Rock markings of type A are present only on the well-preserved rocky wall opposite layer V (fig. 66). They consist exclusively of "sharpening" marks similar to those which can be produced by rubbing a piece of bone against the rock. Some of them may have been made by the inhabitants of layer V, but others must have been produced before VI was deposited. They therefore seem to belong to the phase herein termed Mudukian. The markings in places occur in groups, radiating upwards from a common centre, suggesting a sequence of sharpening marks made by a single person.

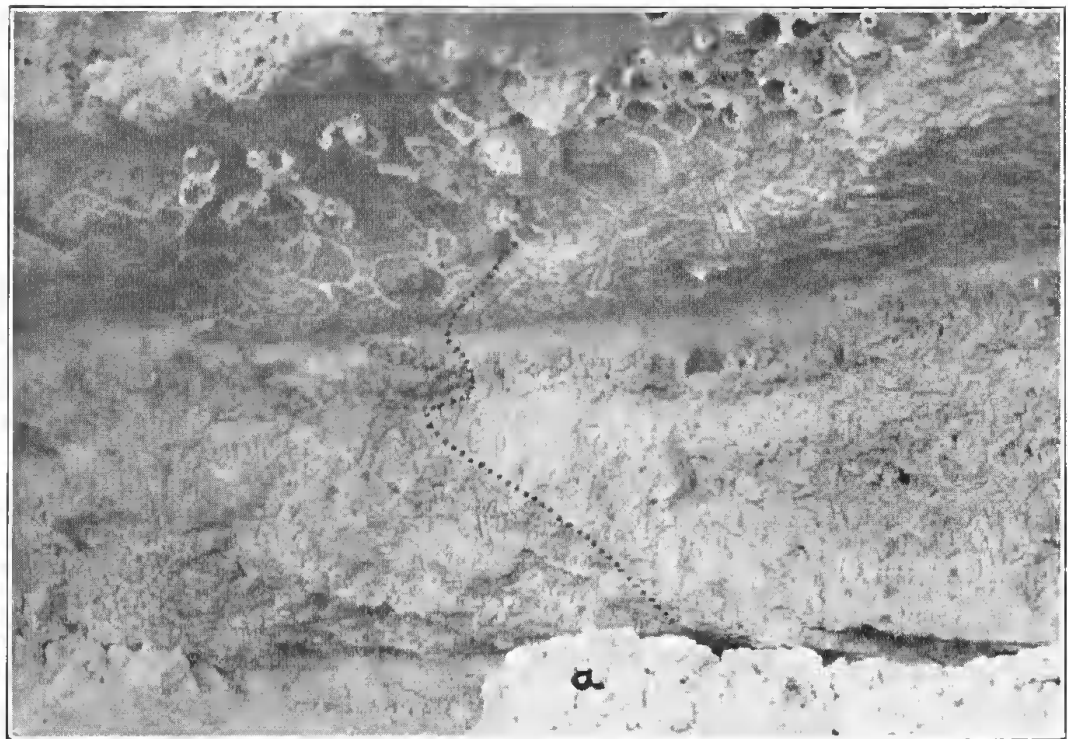


Fig. 247. Western corner of Devon Downs Shelter, showing carvings of type B (left) and type C (right); a indicates the rock fall from this wall on the right of the dotted line.

In the lowest layers of the shelter the faces of cliff and fallen boulders are so decomposed that they have not preserved markings, if such were present.

Carvings of type B consist of meandering lines of great length, tortoises, bird tracks, and "sun" designs, together with rows of small and larger holes such as could be made by rotating a firestick or a javelin with the butt against the rock (fig. 246). These carvings have been largely protected from atmospheric weathering by a thick carbonaceous deposit resulting from fires lit in the shelter. An early limit for the carvings of type B at Devon Downs is indicated by the rock which fell on to the uppermost level of layer V (see figs. 41, e, f, and 43, a), thus exposing part of the present roof of the shelter, upon

which markings of type B were subsequently carved. From land surfaces below layer II artificial aid to enable the artists to reach the roof would have been necessary for the execution of these carvings. On the soft rock of some parts of the back wall of the shelter, type B carvings are obscured by superimposed examples of type C, but elsewhere there is little superimposition.

The big rock which fell on to the uppermost level of layer II, in the western corner of the shelter (figs. 40 and 247. a), bears on its now lower face markings associated with meandering lines and tortoise figures of the same type as those on the roof and back wall immediately to the east of the place occupied by it (fig. 246). On the space cleared by this fall, however (fig. 247), are numerous markings of type C, newer in appearance, and consisting of straight-line markings and other designs, of which a composite series gathered from various faces in the shelter and on the cliff to the east and west are shown in fig. 248; the eight depicted at the top of the figure are from the space vacated by the rock-fall. Incidentally, knowledge of the occupational debris from Murundian levels was supplemented by the material excavated from beside and beneath this fallen rock; layers I to upper III were passed through during this excavation.

FOOD REMAINS AND FAUNAL CHANGES.

The only mammals of which recognizable remains have yet been obtained from the Tartangan beds are Opossum (*Trichasurus* cf. *vulpecula*) and Kangaroos (*Thylagale* sp. and *Macropus* cf. *giganteus*); concerning the latter Mr. H. H. Finlayson comments as follows: "The three fragmentary lower jaws each comprise the posterior third of the body of the ramus, minus the ascending portion; the latter having been broken away at the base of the coronoid. Three distinct individuals are represented, and the teeth include a right third molar, a right fourth molar, a broken third molar, and part of a right fourth molar. Several teeth were freed sufficiently from investing material and from cement, for accurate measurement."

"A right third molar has a length of 13 mm. and width of 7.5 mm. (anterior lobe). The mean values of these dimensions in a series of twelve *M. giganteus* are 13 mm. and 8 mm. A right fourth molar has a length of 14 mm. and a width of 10 mm., whereas the mean value for these dimensions in seven fourth lower molars of *M. giganteus* is 14.3 mm. and 8.4 mm. respectively. The fourth molar is different, therefore, in that its width exceeds by 18 per cent. the value characteristic of modern *M. giganteus*, and in fact is a millimetre wider than the largest fourth molar measured."

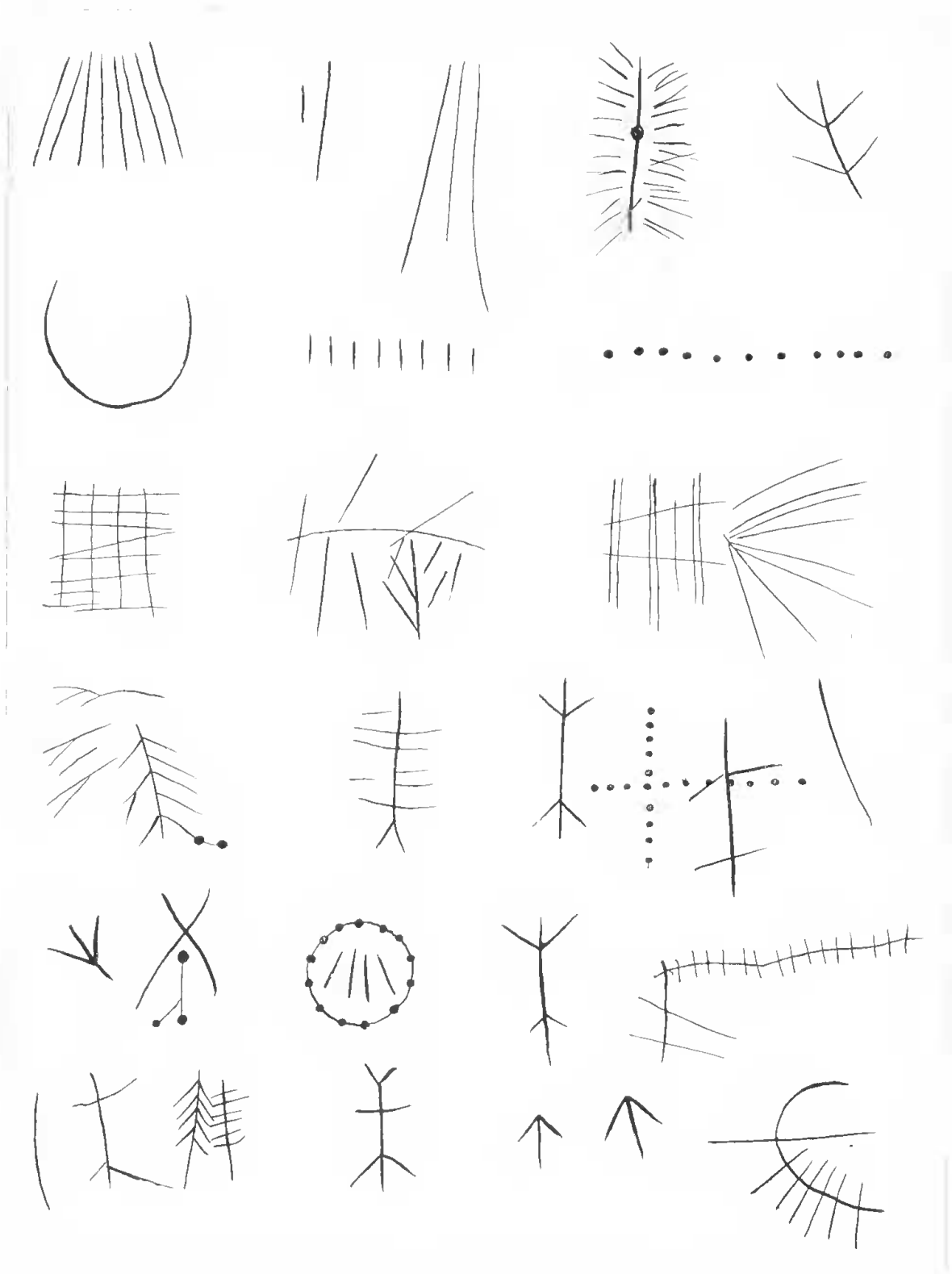


Fig. 248. Rock carvings (type C) from walls of shelter and adjacent cliff, Devon Downs.

The character of the animal food remains at various levels of the shelter, and at Tartanga, affords some indication of the habits of successive occupants.

The inhabitants of Tartangan times exploited river foods, such as fish, shells, and tortoises, although the presence of bone implements and the bones of some large animals prove that they were also hunters.

The Pirrian peoples were also well adjusted to a river environment. In early Mudukian times they were suddenly followed by people who apparently at first fed largely upon the small mammals of the plains, but nevertheless possessed the double-pointed fusiform fishing-bones ("muduk"). In later levels they seem to have become more adjusted to river conditions, and fresh-water foods play a much larger part in their diet. The assumption of the sudden appearance of these dwellers at Devon Downs is strengthened by the abrupt disappearance of the stone "pirri," followed immediately by the arrival of the bone "muduk," etc.

During the examination of the food debris of Devon Downs shelter all the specimens of *Melania*, *Bulinus*, and *Corbicula* in each layer were collected. These shells are of insignificant size, and doubtless were all carried incidentally to the place, and therefore may furnish an index of their relative abundance in the locality at different periods of time.

The accompanying graph (fig. 249), based on the vertical distribution of about a thousand examples, shows that in the lowest layers *Melania* is rare or practically absent; in later levels it tends to become more plentiful, and in layer I it is common. *Bulinus*, on the other hand, is plentiful in the lowest levels, but tends to decrease in number in the upper layers. *Corbicula* seems to have the same progressive tendency to decrease in abundance, as does *Bulinus*.

In reading the graph mental corrections must be made for the differences in thickness of the layers (indicated by the vertical columns), and therefore of the bulk of the debris from which the shells were taken. In the graph a correction has been made in the height of these columns to allow for the fact that only portions of the floor of the excavation were occupied by detritus in the cases of layers XI and XII.

It will be seen that if the above-mentioned correction is made *Bulinus* is 115 times more abundant in XII than it is in the same bulk of material from layer I. It may be remarked that *Bulinus* has a thin, fragile shell, which would not tend to preserve as well as the rugose, thick shell of *Melania*.

Melania is stated to be sometimes indicative of brackish water conditions, whereas *Bulinus* is a fresh-water dweller (Watts, 1905). Thus the graph suggests that during the period of deposition of the material in the shelter there has been a progressive modification in environmental conditions due to climatic changes in the direction of the semi-arid conditions of the lower watershed characteristic of the present time.

With the exception of some mussels (*Unio cf. stuarti*) from layer III, the *Unio* fauna varied little in all layers of the shelter; in lower layers they were much decomposed, and broke readily on being disturbed. All the examples of *U. angasi* and *U. villatus* examined were thin-shelled.

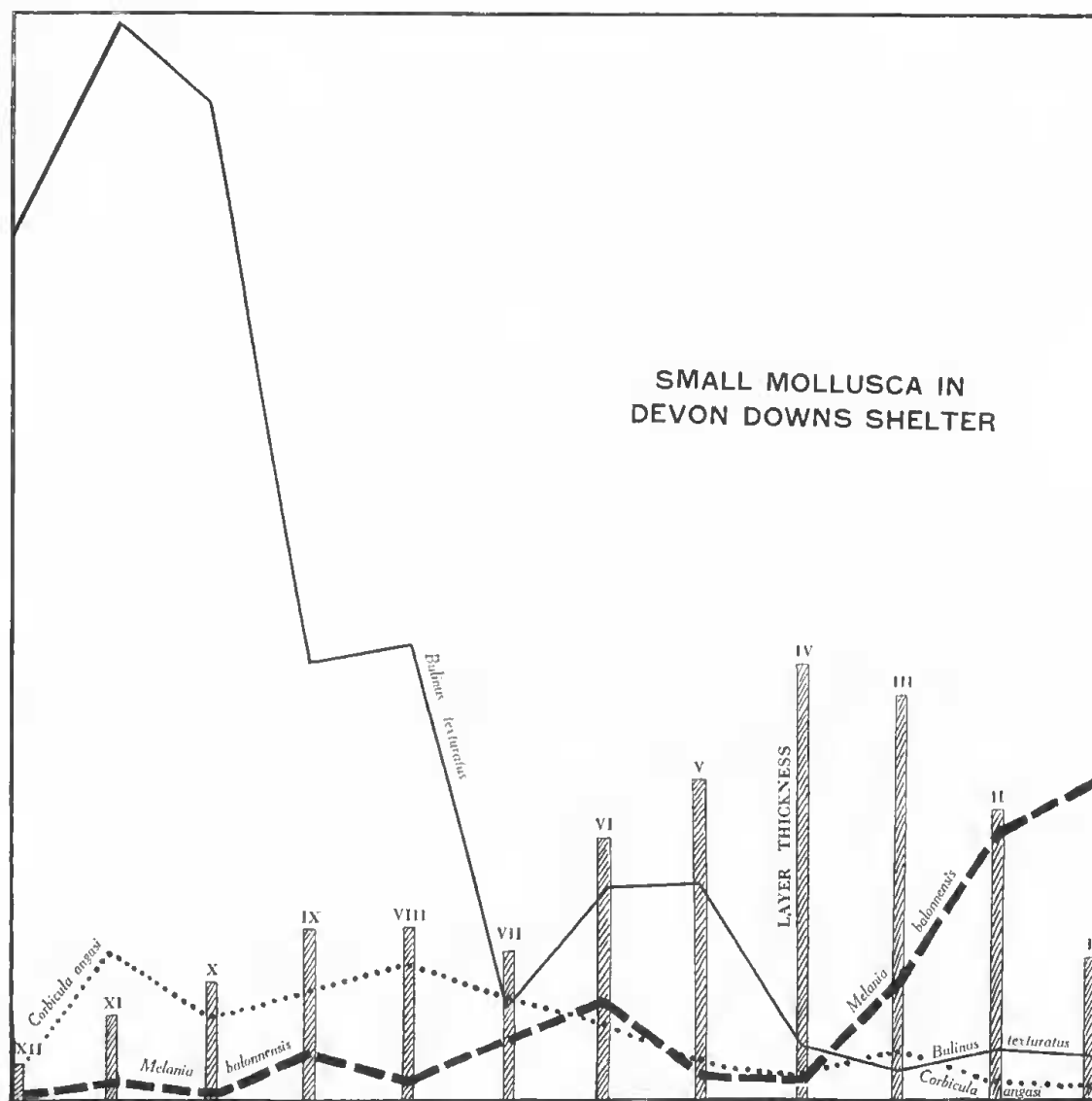


Fig. 249. Graph showing variations in the relative abundance of *Melania*, *Bulinus*, and *Corbicula* during the deposition of occupational debris in Devon Downs Shelter. (The curves have not been corrected for differences in the thickness of the layers.)

In Pirrian times *Paludina* was apparently used as food, for it is only in these levels that very large as well as the young shells occur. In all other levels by far the greatest number are the juvenile examples.

Some other faunal changes are indicated by the presence in layer X of a turtle which differs from all the species at present known from the Murray

River, but apparently closely approaches *Chelodina expansa*, a species hitherto recorded only from northern Australia. The occurrence of bones of *Sarcophilus* in and below layer VI is notable. *Sarcophilus* has never been found alive in South Australia; indeed, its presence on the Australian mainland in modern times is not yet fully established, although Kershaw (1912) has brought forward some circumstantial evidence regarding the capture of a living specimen at Toohorac, 63 miles from Melbourne, but left the question open as to whether it was an indigene or a Tasmanian example which had escaped from captivity.

HUMAN REMAINS.

Tartanga. A full discussion of the relationship of the Tartangan human remains must await detailed study. The material at present available suggests that they may be those of representatives of an early form of the Australian race, serving to link the problematical Talgai remains (of supposed Pleistocene Age) with the present-day natives of the south coast of South Australia.

The maxilla-alveolar breadth of *Tartanga i* is the same as that of Talgai, but the length is about 5 mm. less, chiefly owing to a reduction in the region anterior to the molars. The estimated area of the palate of *Tartanga i* youth (3,600) is conservative, and would have been somewhat increased had the individual attained maturity. Nevertheless, this area is one which in recent Australians is only attained by adult males of exceptional dimensions. The maxilla fragment of *Tartanga ii* indicates that this second individual had a smaller palate.

With the exceptions noted by Campbell, the teeth of *Tartanga i* and *Tartanga ii* are above the average for individual Australian teeth; this feature is particularly marked in the case of the incisors and to a lesser extent in the canines. The exceptional teeth are the upper third molars, which are, as in Talgai, of less than average dimensions. The crenation of these teeth is also more marked than is usual in Australian natives.

Other comparisons with the Talgai remains are only possible in general terms, because of the crushed condition of the latter. The individuals are not adult, and in *Tartanga i* (as in Talgai) the frontal development is not great. The proportions of the upper face, as far as can be judged at present, are different. The length-breadth index of Talgai, as estimated, is close to that of *Tartanga i*, but the ear-bregma height is less.

The mode of burial of the Tartangan people can be surmised from an examination of the strikingly similar positions of the skeletons of *Tartanga i* and *Tartanga iii*. It seems probable that the bodies were placed in their shallow graves, lying on their backs in an extended position, with one arm flexed so that

the hand was resting on a breast or shoulder, and the other arm lying close to the side, and, particularly in the case of Tartanga iii (fig. 19), with the hand covering the genitals.

The presence of portion of what is probably a bone implement in the palatal region of Tartanga i raises the query as to whether it was placed there at the time of burial or whether it was instrumental in bringing about the death of the youth. Other bone implements were lying beside and beneath the head, and it is suggested that their presence may have been of ceremonial import. The absence of the lower jaw also may have a similar significance.

The disassociated condition and position of the fragmentary remains of Tartanga ii which were recovered suggest that this skeleton was partly disturbed and broken by the excavators of the grave of Tartanga i. This disturbance took place before the bones became mineralized, as is indicated by the fact that the maxilla fragment, which was apparently left in the D bed undisturbed, shows the characteristic staining, etc., of remains from that horizon, whereas the lower jaw, which was replaced at a somewhat higher level, seems to be stained more like bones from bed E.

Devon Downs. All the human remains so far recovered from Devon Downs shelter are those of infants, and several types of burial are apparent. With the exception of a single tooth in layer XI, and a Mudukian child burial in layer VI, which was disturbed in early Murundian times, all the remains belong to the Murundian period. The condition of the oldest Murundian remains (the burial from the "brown level" of layer IV) suggests that the bones were interred after decomposition of the flesh; notable features in this case are the remarkable depth of the grave and the fact that it passed through a consolidated layer, broken portions of which were used to form a protection around the bones.

As described, the child in layer III was evidently placed in an unfilled chamber formed of masses of limestone, and the association of bones was complete, indicating burial in the flesh. Dr. T. D. Campbell writes: "The teeth of this and the preceding child constitute the most notable of all the human material secured from the shelter. In the child from layer III the teeth are very large, and considerably exceed the average dimensions given (Black) for the deciduous dentition of Europeans. The form of the teeth, particularly the upper central incisors and the four canines, presents simian characteristics. All the deciduous canines are of such a shape and in such a position in the arch relative to their neighbours that they project beyond the level of the other teeth and interlock in a fashion suggestive of the usual simian condition; these features are also characteristic of the dentition of the child from layer IV, and both are striking examples of the persistence of markedly primitive conditions in recent members of the Australian race."

The baby in layer II was partly disturbed before notes could be taken, but apparently was also buried shortly after death.

In 1927 Sheard, Momtford, and Hackett described the desiccated remains of a child, preserved under entirely different conditions, at Fromm's Landing, a few kilometres to the south. A white quartzite leaf-point of the type characteristic of Pirrian levels at Devon Downs was discovered in the wrappings of this specimen. Its presence suggests the possibility of the remains belonging to the Pirrian period. This desiccated child, in its grass and kangaroo skin wrappings, may well have been preserved for a considerable time in the high and well-protected rocky hollow in which it was placed, where it was isolated from contact with moisture or earth. Further, it was protected and sealed down by a thick, consolidated covering of animal excreta.

ACKNOWLEDGMENTS.

As already mentioned, Mr. W. R. Roy, of New Devon Downs, drew attention to the occurrence of human remains at Tartanga, and the credit of the initial discovery is due to him. For ready permission to camp and excavate on their properties our thanks are due to Messrs. F. Preiss and C. G. Herrmann, respective owners of the sections on which Tartanga and Devon Downs shelter are situated.

Drs. C. Fenner and T. D. Campbell visited the sites concerned on May 26, 1929, examined Tartanga, No. 1, *in situ*, and inspected all other data then available; we are indebted to Dr. Fenner for much information and advice, especially on matters relating to the physiography of this part of the Lower Murray Valley, and to Dr. Campbell, who herein briefly describes the dentitions of the human material, reserving a detailed account for subsequent publication.

Among others who examined the evidence at Tartanga and Devon Downs were Messrs. H. L. Sheard and F. J. Hall; during the inspection the former discovered the remarkable bone implement shown in fig. 24.

For the examination and identification of much of the abundant but largely fragmentary animal remains we have to thank Mr. H. H. Finlayson (mammals), Dr. A. M. Morgan and Mr. J. Sutton (birds), Messrs. H. Longman and J. R. Kinghorn (a turtle), and Mr. B. Cotton (molluses). Professor J. A. Prescott kindly tested soil samples, and Mr. A. R. Alderman extended assistance in the identification of rocks.

Mr. J. Rau (Taxidermist in this Museum) treated and assembled the fragments of human skulls, and we herewith express our high appreciation of the painstaking and efficient manner in which he has carried out this tedious work.

Messrs. B. Cotton (Assistant Conchologist) and J. Conroy and H. Condon

(Museum Assistants) co-operated heartily as our field companions, and the last-named is responsible for the illustrations bearing his initials.

V. SUMMARY.

At Tartanga there are human remains associated with food debris and an old culture. Geological and physiographical features show that these occupational records are at least of some antiquity.

At Devon Downs, nearby, is a shelter younger than the Tartanga site; it contains well-stratified occupational debris six metres in depth, which furnishes indications of the influence of four cultural phases. The animal remains suggest that faunal modifications, possibly due to climatic variations, have occurred.

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